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可持续渔业管理的支柱： 几种管理制度的比较分析

Pillars Of Sustainable Fisheries Management: A Comparative Analysis Of Several Regulatory Regimes



自然资源保护协会
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执行摘要

健康的渔业能为渔业国家提供诸多益处。高产和丰富多样的鱼类种群提供食物，创造就业机会，带来收入，并促进国家的文化特质和生态健康。一个强有力的管理制度有助于长期维持鱼类种群，使这些利益最大化。有效的管理制度可以帮助结束过度捕捞，恢复枯竭的渔业种群，振兴与繁荣渔业。最根本的是，这种制度一般包括确定、执行和强制遵守可持续捕捞水平的做法。

本白皮书比较了《联合国海洋法公约》（UNCLOS）以及澳大利亚、新西兰、欧盟和美国的渔业法律和政策中有关促进渔业健康的标准、规定和确保遵守的机制。管理制度随着时间的推移不断演变，对它们进行研究有助于我们深入了解不同的渔业国家如何实现可持续性，并为结束过度捕捞，恢复枯竭的渔业，重建渔业产业中受影响的部门提供启示。对每种制度（UNCLOS、澳大利亚、新西兰、欧盟和美国），我们一致地比较了其可持续性标准、科学的角色、控制捕捞死亡率的措施、许可制度、监测体系和确保遵守（执法）的工具。

可持续性标准

该白皮书所讨论的几种管理制度，通常是以三个密切相关的标准之一为基础：最大可持续产量、最大经济产量和最优产量。尽管这三项标准都是为了促进渔业的可持续性，但它们在分析中纳入了不同的成本和收益。最大可持续产量是联合国采用的基准，其目的是实现可长期维持的最大平均捕获量，它衡量成功的标准是渔业种群本身。相反，最大经济产量是根据经济回报（包括收入和捕捞成本）来衡量成功的，重点是取得渔业产业的最大平均商业回报。在大多数情况下，当以最大经济产量而非最大可持续产量进行管理时，海里的鱼群规模会更大。美国法律规定的最优产量，实际上是最大可持续产量，减去为相关的社会、经济或生态因素考量的部分。

基于科学的管理

该白皮书所讨论的几种管理制度，一个共同特点是其法律或规定中要求将现有的最佳科学信息纳入养护措施。这些制度认为，科学家收集到的数据以及据此作出的估算，涉及诸如种群数量、繁殖率、死亡率、捕获率、副渔获物及渔业对环境的影响等问题，对于决策者作出及时和知情的决策以实现资源的可持续性是有必要的。

控制捕捞死亡率的机制

为了达到可持续性标准，控制渔业捕捞死亡率的养护措施通常有两种主要形式：产出控制和投入控制。产出控制的重点是可以从海洋中取出多少，通常做法是为鱼类种群设定捕捞量限额。投入控制通过限制捕鱼中使用的资源来控制捕捞死亡率，如渔民可使用的渔船数量和设备类型。该白皮书中讨论的这几种管理制度通常同时采用产出控制和投入控制。

许可证、执照和船舶登记

该白皮书所讨论的每种管理制度都采用了许可证、执照或船舶登记制度，以确定和限制从事商业捕捞的渔船的数量。这些制度包括给渔民发放许可证或执照，授权允许或限制渔民从事某种渔业，以及发放给渔获收购者的许可证或执照，用以管理可以购买渔获的一方。许可证或执照可能同时限制可捕鱼种的种类和数量。

监测机制

该白皮书所讨论的每一种管理制度都包括对渔获物、船只和其他类型的监测机制，以监测渔民是否遵守了相关的渔业管理规定，并收集渔业资源评估所需的数据。这些监测机制多种多样，从统计渔获量的纸质捕捞日志到追踪渔船位置的先进卫星技术，一应俱全。每个制度还要求其商业渔船接受政府授权的海上观察员的随船观察。本文所讨论的所有渔业管理制度都采用了多种方法的组合来监测渔船的行为活动和渔获量。

确保遵守的措施（执法）

任何管理制度如果不采取惩罚违规者的执法措施，就不会有效。该白皮书所探讨的几个管理制度，均设有不同的执法机制，以促进遵守规定、阻吓罪行和惩罚违法者。这些措施包括制裁，例如暂停或撤销许可证；民事罚款和没收；以及对最恶劣的违法行为提起刑事诉讼。

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渔业可持续性标准

可持续性标准代表了管理制度的目标，即一个渔业国家想要从渔业中获得的产量水平，通常以年度为基础，分不同渔业设定。本白皮书所研究的几种制度均采用了三种标准之一：最大可持续产量（MSY）、最大经济产量（MEY）或最佳产量（OY）。

《海洋法公约》



《联合国海洋法公约》（《海洋法公约》）常被称为海洋宪法，是一项为海洋和海洋活动提供总体法律框架的国际条约。除其他内容外，《海洋法公约》规定了一套全面的国际规则，处理各国各自专属经济区内和国际水域内的渔业活动。这些规则在很大程度上说的就是国家的权利和义务，以及在跨界鱼类种群和高度洄游鱼种方面进行合作的义务¹。截至今日，已有 168 个联合国缔约国批准了《海洋法公约》，包括澳大利亚、新西兰、中国和欧盟。美国和其他 13 个国家是该条约的签署国，但还没有批准它。

《海洋法公约》采用“最大可持续产量”（MSY）作为国际可持续性标准²。根据《海洋法公约》，渔业管理和养护措施的“目的应是在包括沿海渔民社区的经济需要和发展中国家的特殊要求在内的各种有关的环境和经济因素的限制下，使捕捞鱼种的数量维持在或恢复到能够生产最大可持续产量的水平，并考虑到捕捞方式、种群的相互依存以及任何一般建议的国际最低标准，不论是分区域、区域或全球性的。”³。

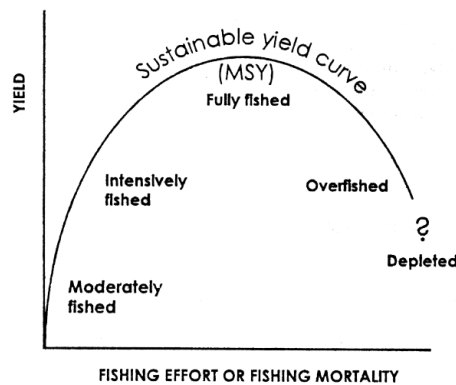
1 Martin Tasamenyi 和 Quentin Hanich, 《海洋法公约》下的渔业管辖权, 载于《1982 年海洋法公约》30 周年：成功、挑战和新议程 第 108, 110 页 (David Freestone 编辑, 2013 年)。

2 见《联合国海洋法公约》，1982 年 12 月 10 日, 1833 U.N.T.S. 397, http://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf (最后一次访问 2019 年 2 月 4 日), 第 61 条, 第 119 条 [下称 UNCLOS]。

3 同上。第 61 条 ¶ 3。

虽然《海洋法公约》本身没有提供 MSY 的定义，但 MSY 一般被理解为“在当前的生态和环境条件下可以从一个[鱼类]种群或混合种群中捕捞的最大的长期平均渔获量或产量”⁴。为了防止过度捕捞，维持渔业的存续和蓬勃发展，实现 MSY 的鱼类种群能够在无限期内产出最大的产量⁵。

MSY 通常以公吨计量。例如，假定一个鱼业的最大可持续产量为每年 100 万公吨，如果在几年内每年从鱼群中抽取超过 100 万公吨的鱼，就有可能使该国无法在今后几年内捕捞到 100 万公吨的渔获量。在同一个例子中，每年抽取少于 100 万公吨的捕获量则导致该国比它应该捕捞的渔获量少。下图说明了 MSY 的概念：



© S.M. Garcia, 粮农组织渔业部渔业资源司⁶

1995 年通过并于 2001 年生效的《执行 1982 年 12 月 10 日〈联合国海洋法公约〉有关养护和管理跨界鱼类种群和高度洄游鱼类种群的规定的协定》（《联合国鱼类种群协定》）补充了《海洋法公约》中的渔业管理规定⁷。除了重申 MSY 是可持续发展的标准外，《联合国鱼类种群协定》还明确规定，MSY 应作为所有渔业的参考点。对于未过度捕捞的健康鱼类种群，《联合国鱼类种群协定》规定，制定渔业管理策略应确保捕捞死亡率不超过最大可持续产量对应的水平。对于过度捕捞的种群，应该把能够产生最大可持续产量的生物量作为重建目标⁸。

澳大利亚

澳大利亚的可持续性标准是“最大经济产量”，即 MEY，而不是 MSY⁹。MEY 是渔业总收入和

4 见贸易和农业司渔业委员会，经合组织《2017 年渔业审查：渔业政策总调查》5（2018 年 1 月 23 日），[http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=TAD/FI\(2017\)14/FINAL&docLanguage=En](http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=TAD/FI(2017)14/FINAL&docLanguage=En)（最后一次访问 2019 年 2 月 4 日）。

5 见 S.M. Garcia, 渔业资源司，渔业部，联合国粮农组织，渔业的预防性方法及其对渔业研究、技术和管理的影响：最新的回顾，渔业的预防性方法——第二部分：科学（1995 年 6 月），<http://www.fao.org/3/W1238E02.htm>（最后一次访问 2019 年 2 月 4 日）。

6 同上。

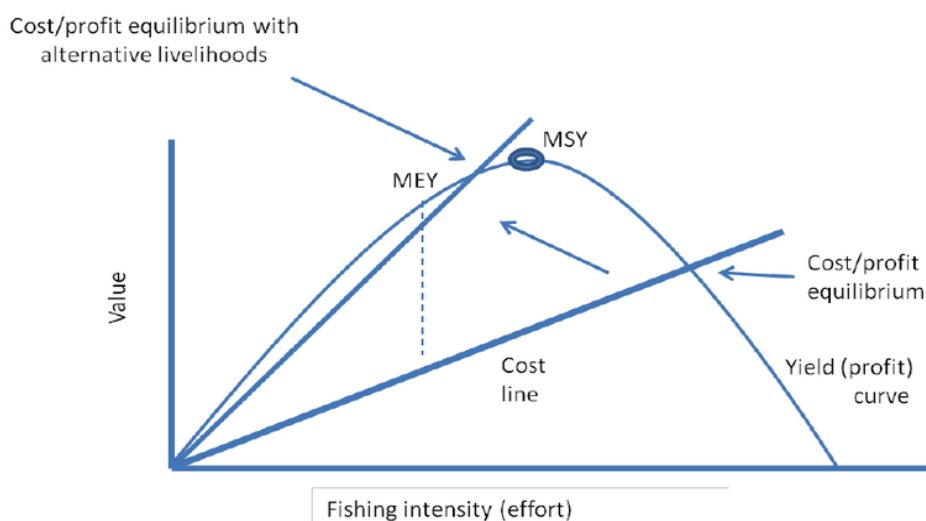
7 《联合国关于执行 1982 年 12 月 10 日联合国海洋法公约有关养护和管理跨界鱼类种群和高度洄游鱼类种群的规定的协定》，1995 年 8 月 4 日，2167 U.N.T.S. 88。<https://documents-dds-ny.un.org/doc/UNDOC/GEN/N95/274/67/PDF/N9527467.PDF?OpenElement>（上次访问日期为 2019 年 2 月 4 日）[下称《联合国鱼类种群协定》]。

8 同上，附件二 ¶7。

9 澳大利亚农业与水资源部，《关于执行英联邦渔业捕捞策略政策的准则》6（2018 年第二版），可在 <http://www.agriculture.gov.au/SiteCollectionDocuments/fisheries/domestic/harvest-strategy-policy-guidelines.pdf> 上查阅（最近一次访问 2019 年 2 月 4 日）。

总成本之间正差异的最大值，其中的成本包括劳动力和资本成本。因此，与 MSY 根据公吨鱼类的产量来衡量可持续性不同，MEY 是根据商业渔业的长期盈利能力来衡量可持续性¹⁰。根据 MEY 标准，澳大利亚英联邦渔业中主要商业鱼种的捕捞策略 [应] 旨在实现鱼类的最大经济产量¹¹。MEY 标准的倡导者认为，它比 MSY 标准得出更少的产量和渔业更高的自然和经济弹性。这是因为它将经济成本纳入了公式¹²。

例如，MSY 可能得出每年应捕获 100 万公吨的渔获量，MEY 则有可能计算出每年应捕获 75 万吨，如果发现捕捞额外的这 25 万公吨鱼将导致利润下降的话。这种情况是有可能出现的，譬如捕捞这些额外渔获所需的成本和努力大于相关收入，或者额外的鱼类供应导致鱼的市场价格下降并降低该鱼种的总体盈利能力。出于这个原因，一些 MEY 的拥护者认为这是一个比 MSY 更经济合理，更环保的标准¹³。下面是一个图表，说明了 MSY 和 MEY 之间的区别：



© Douglas Fenner, 管理多样化珊瑚礁渔业面临的挑战, 4 多样性 105, 117 (2012)。

新西兰

新西兰采用 MSY 作为其可持续性标准。新西兰将 MSY 定义为“在考虑了种群数量动态和任何影响鱼类种群的环境因素的情况下，在保持鱼类种群生产能力的同时，能够取得的最大产量。”¹⁴ 因此，新西兰的养护措施旨在使捕捞量保持在或高于能够达到 MSY 的水平，或者如果种群已经处在低于 MSY 的水平，捕捞量则应设定在能将种群恢复到能够无限期产出的 MSY 的水平。¹⁵

10 见《关于执行英联邦渔业捕捞策略政策的准则》，前注 9，于 19 页。

11 澳大利亚农业与水资源部，《英联邦渔业捕捞策略：政策和准则》4（2007 年 9 月），链接：<https://www.ccsbt.org/en/system/files/resource/en/4d901b50bfe92/05.pdf>（上次访问是在 2019 年 2 月 4 日）[2007 年英联邦渔业政策]。

12 见如《关于执行英联邦渔业捕捞策略政策的准则》，前注 9，第 19 页（“世界上一些商业鱼类种群的管理达到了最大可持续产量（BMSY）的生物量目标。这一目标最大限度地利用了渔业可捕获的长期捕获量，但忽略了捕捞成本的不断增加，因为鱼类种群已降至 BMSY 水平。一般是在较低的捕获水平（相反，较高的生物量，BMEY），其目的是最大限度地提高捕鱼的经济回报，而不是最大限度地增加鱼的捕捞量。”）

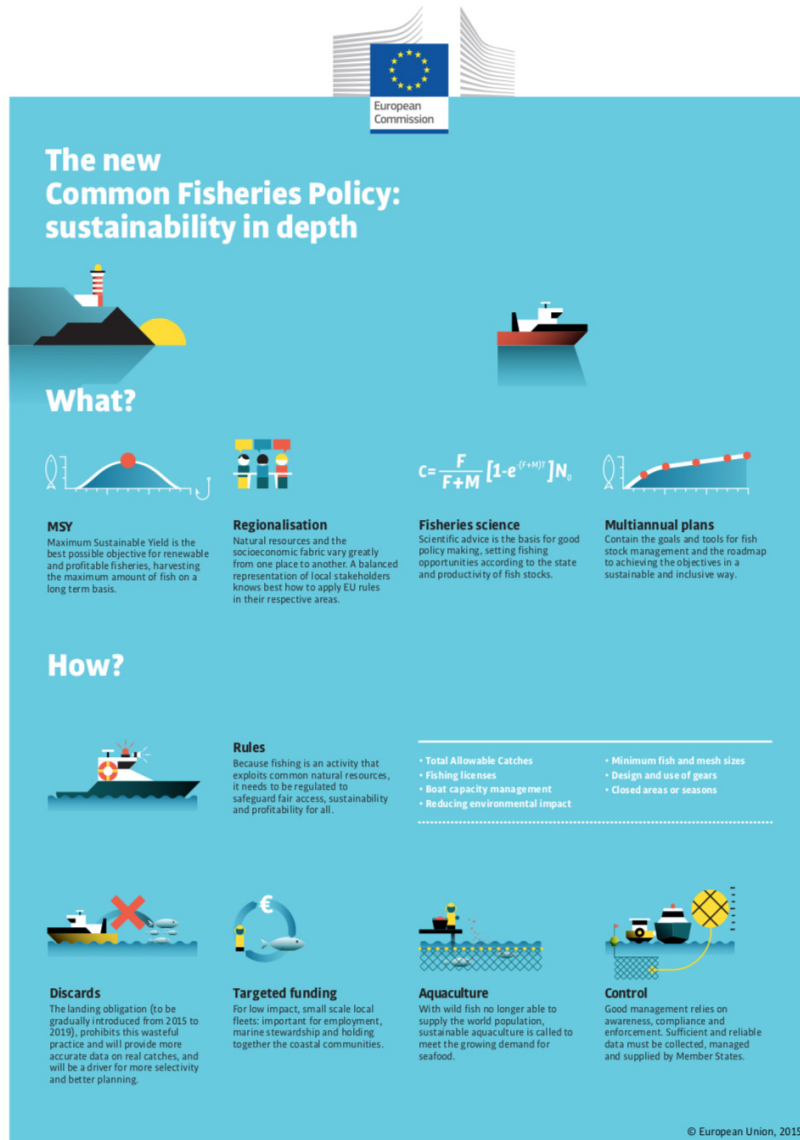
13 见如 Douglas Fenner, 管理不同珊瑚礁渔业的挑战, 4 多样性 105, 116-17 (2012), available at https://www.researchgate.net/publication/272648936_Challenges_for_Managing_Fisheries_on_Diverse_Coral_Reefs（上次访问日期：2019 年 2 月 4 日）。

14 1996 年《新西兰渔业法》，第 2 条。

15 同上，第 13 条。

欧盟

欧盟采用了 MSY 作为其可持续性标准。欧盟将 MSY 定义为“在现有的平均环境条件下，在不显著影响繁殖过程的情况下，从鱼类种群中能持续获得的最高理论均衡产量。”作为指导成员国渔业管理和养护规则的最高法律框架¹⁶，欧盟共同渔业政策把 2020 年结束过度捕捞作为其主要目标之一，旨在将所有鱼类种群的生物量（即每个鱼类种群的总重）都能恢复和维持在能够产生 MSY 的水平之上¹⁷。欧盟通过以下总结促进了其管理制度：



© https://ec.europa.eu/fisheries/sites/fisheries/files/docs/body/2015-cfp-management_en.pdf

16 条例（欧共体）欧洲议会和欧盟理事会 2013 年 12 月 11 日关于共同渔业政策的第 1380/2013 号决定，第 4 条。参见网站：<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32013R1380>（最后一次访问日期为 2019 年 2 月 4 日）[以下称为“CFP2013”]。另见欧盟委员会，欧盟委员会致欧盟理事会和欧洲议会的函件——通过最大可持续产量实现欧盟渔业的可持续性（2006 年），见 <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52006DC0360>（上次访问日期：2019 年 2 月 4 日）。

17 CFP 2013，前注 16，条款 2 ¶ 2。

美国

美国采用了“最优产量”，即 OY，作为其可持续性标准。OY 一般被定义为“渔业的最大可持续产量，并考虑任何相关的社会、经济或生态因素后相应减少。”¹⁸ 社会因素包括“从休闲捕鱼中获得的乐趣”、“保留渔民及其家人的生活方式”以及“当地社区对渔业的依赖”。¹⁹ 经济因素包括“鼓励扩大美国捕捞海产品的国内和出口市场”、“种群数量增加带来的单位捕捞量成本下降”以及“可供选择的就业机会”²⁰。生态因素包括渔业对濒危物种、饵料鱼种和海洋哺乳动物的影响²¹。

对于过度捕捞的渔业，OY 呼吁将该渔业恢复到“与这种渔业的最大可持续产量相一致的水平。”²²

在 OY 标准下，解决不确定性的途径是设定更低的产量。如果一个渔业对估算自己的种群生物量有信心，并且其管理有能力准确地限制捕获量，那么最佳产量可能被设定地“非常接近于 MSY”。相反，如果估算和管理控制是不确定的，最佳产量“应设置得离 MSY 更远”²³。

因此，虽然 MSY 被明确纳入了美国的管理制度，但总体采用的 OY 标准意味着产量一般不会超过 MSY，而是捕捞努力和产量都低于 MSY。因此，美国的最佳产量标准 OY，就像 MEY，一般被认为比 MSY 更环保²⁴。

18 《美国法典》16 § 1802(33)（着重号为后续添加）。

19 50 C.F.R. § 600.310(e)(3)(iii)(B)。

20 同上。

21 同上。

22 《美国法典》16 § 1802(33)。

23 50 C.F.R. § 600.310(e)(3)(iv)。

24 见 Fenner，《多样化珊瑚礁渔业管理的挑战》，前注 13，第 117 页。

基于科学的管理

本白皮书所研究的几个管理制度都非常依赖科学为管理决策提供支撑。每一种制度都要求将现有的最佳科学证据纳入其渔业管理。它们认为，与鱼类种群生物量、繁殖率、死亡率、鱼种平均年龄和大小以及渔业对环境的影响等有关的经验数据以及最新的科学知识和方法，对于实施和确保开展可持续的渔业活动是至关重要的。

《海洋法公约》

《海洋法公约》要求其成员国根据现有的最佳科学证据制定其渔业养护措施。具体而言，《海洋法公约》第 61 条规定：“沿海国参照其现有的最佳科学证据，应通过正当的养护和管理措施，确保专属经济区内生物资源的维持不受过度开发的危害……²⁵”虽然《海洋法公约》没有界定“现有的最佳科学证据”，但该标准被解释为有利于养护，并且是令人信服的科学证据，能证明预测的收获将在增加收获之前实现最大的可持续产量²⁶。

澳大利亚

在澳大利亚，该国渔业管理的“所有关键决定”必须以“现有最佳科学”为基础²⁷。据负责管理国家渔业和颁布养护措施的澳大利亚渔业管理局 (AFMA) 解释，这项政策要求决策者在为澳大利亚渔业做管理决策的时候必须考虑“最新”科学研究²⁸。有些研究是由澳大利亚渔业研究与发展公司完成的，该公司是澳大利亚政府与渔业和水产养殖业共同资助的一个伙伴机构²⁹。对于 AFMA 渔业，科学意见主要由英联邦科学和工业研究组织提供，同时州的渔业科学家和一些科学顾问也作出了重要贡献。每个主要的 AFMA 渔业都有一个资源评估小组 (RAG)，该小组审议收集到的科学证据和渔业评估，并就鱼类种群、物种、渔业经济和渔业对环境的影响向 AFMA 提供意见³⁰。最后，每个 RAG 都会提出建议，用于为每个商业鱼种设置“总可捕量”，也称为“TAC”³¹。

25 《海洋法公约》，前注 2，第 61 条。《海洋法公约》第 119 条同样规定，“各国应确定公海生物资源的可捕量并制定其他养护措施。采取措施，根据有关国家掌握的最佳科学证据，将收获物种的种群维持或恢复到能够产生最大可持续产量的水平……”同上。第 119 条。

26 E. Latifah 和 M.N. Imanullah，气候变化背景下渔业管理中的预防性原则：国际法律框架如何制定？，129 IOP 会议系列：地球科学与环境科学。(2018)，doi: 10.1088/1755-1315/129/1/012038，可获于：<https://iopscience.iop.org/article/10.1088/1755-1315/129/1/012038/pdf>。

27 2007 年英联邦渔业政策，前注 11，于 7。

28 FRDC 公布新科学 (2016 年 10 月 21 日)，AFMA，<https://www.afma.gov.au/frdc-releases-new-science> (最后浏览于 2019 年 2 月 4 日)。

29 同上。

30 2018 年采用基于证据的方法设定捕获水平的框架，前注 9，于 21。同看 Pail Marchal 等，欧盟与其他国家渔业管理经验比较：冰岛、澳大利亚和新西兰。[作者最终出版草案] (2016 年 9 月)，10-11 页。<https://archimer.ifremer.fr/doc/00312/42305/41699.pdf> (最后打开于 2019 年 2 月 12 日)。

31 澳大利亚农业和水资源部，《2018 年渔业状况报告》，第 119，144 页 (2018 年 9 月)，<http://www.agriculture.gov.au/SiteCollectionDocuments/abares/publications/fsr2018.pdf>。

新西兰

新西兰的法律要求渔业管理的决策，即与渔业资源的利用和可持续性有关的决定，必须以“现有最佳信息”为基础³²。“现有最佳信息”包括科学、文化、社会和经济信息，只要政策制定者能够以合理的成本、精力或时间获得这些信息³³。因此，初级产业部长（原称渔业部长）有义务使用最佳可用信息来设定 TACs 以实现 MSY。在由于缺乏信息而存在不确定性的情况下，部长仍有责任确保 TAC 的设定“不违背维持鱼类种群处于或高于产生 MSY 的水平或者促进鱼类种群取得或高于 MSY 水平”的目标³⁴。

在新西兰，科学研究由初级产业部监督³⁵。与该部签约的研究人员向“渔业评估工作组（FAWGs）”汇报，该工作组由政府、工业界和非政府组织的科学家组成。各 FAWGs 全年举行会议，对研究结果进行评估，并就 TAC 的水平调整等事项提出建议³⁶。

欧盟

欧盟要求其成员国采取的保护措施必须以现有的最佳科学证据为基础。欧盟的共同渔业政策明确规定，“根据现有的最佳科学建议”制定管理措施³⁷。共同渔业政策还要求“根据现有的最佳科学建议”确定可捕量³⁸。欧盟从多个团体获得科学建议，包括欧盟渔业科学、技术与经济委员会，该委员会直接向欧盟委员会报告，由海洋生物学、生态学、渔业科学、渔具学和其他领域专家组成。欧盟还依赖国际海洋勘探理事会（ICES），该理事会负责开展和协调有关北大西洋海洋生态系统的研究。其他机构还包括地中海渔业总委员会的科学咨询委员会，它提供关于地中海和黑海的意见，以及各区域组织的科学委员会。

32 1996 年《新西兰渔业法》，第 10 条和第 13-2A 条。

33 同上，第 2 条。

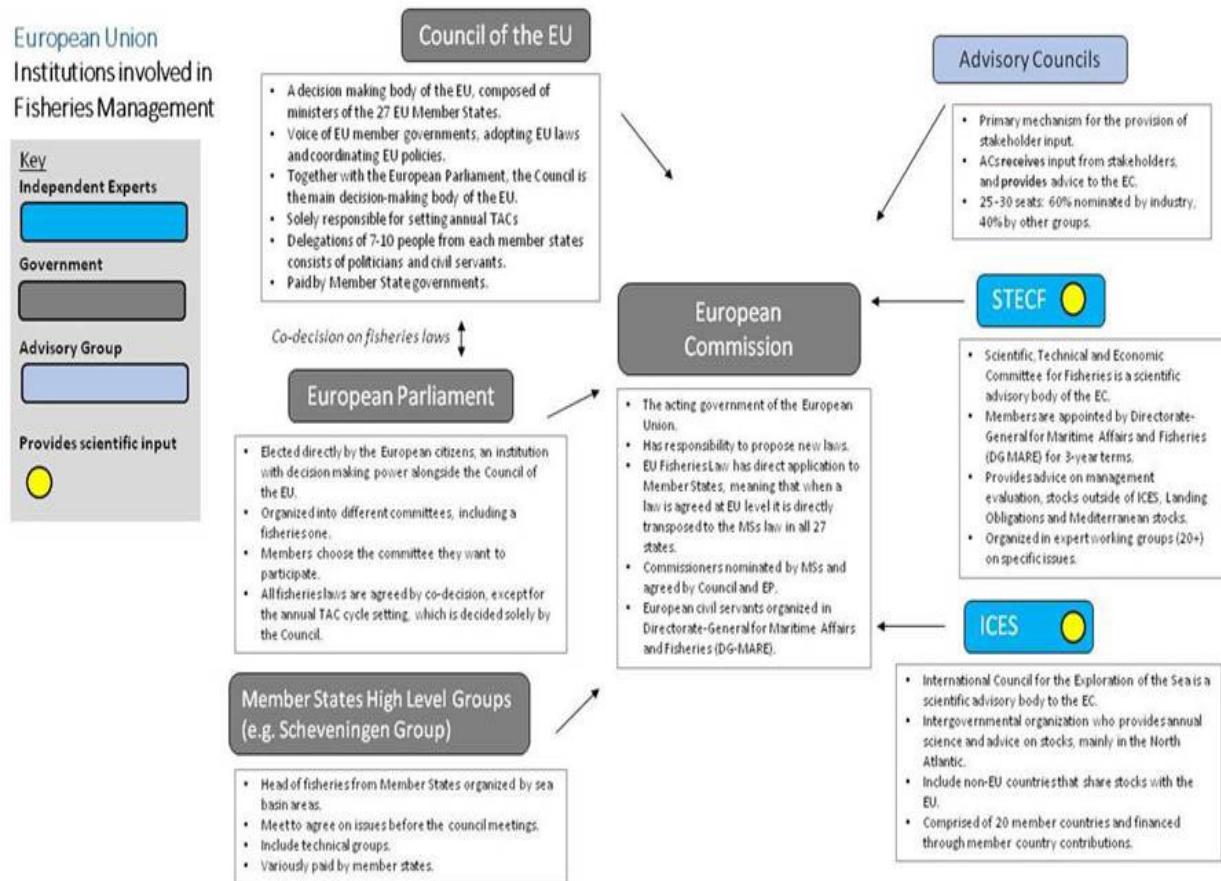
34 同上，第 13-2A 条。

35 见 Lynne Zeitlin Hale 和 Jeremy Rude（编辑），大自然保护协会，《从新西兰在配额管理制度下管理渔业的 30 年经验中学习》（2017 年），见 <https://www.Nature.org/media/asia-pacific/New-Zealand-Fisheries-Quota-Management.pdf>（上次访问日期：2019 年 2 月 13 日）[下称“从新西兰学习”]。

36 同上，第 46-47 页。

37 CFP 2013 年，第 3 条 (c) 款。

38 CFP 2013 年，第 31 条 (4) 款。但见 Fiona Harvey & Arthur Neslen（编辑），《渔业配额挑战科学家的建议》《卫报》（2014 年 12 月 16 日），可在网上查到：<https://www.TheGuardian.com/environment/2014/Dec/16/Fishing-Quotas-Defy-Scientists-Advice>（注意到欧洲环境专员卡梅努·贝拉“承认许多关于配额的决定与科学建议相违背”）。（上次访问于 2019 年 2 月 4 日）。



来源：NRDC 和常博文

美国

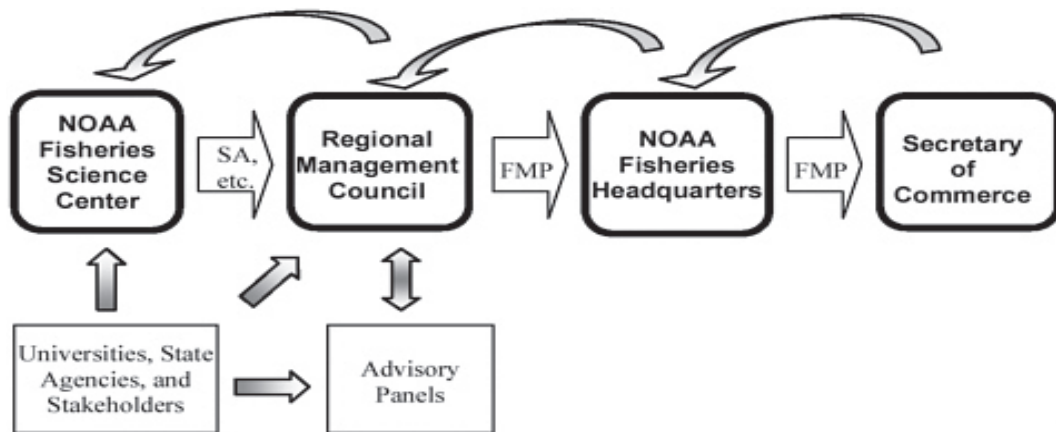
美国同样要求渔业养护和管理措施以“现有最佳科学信息”为基础³⁹。《马格努森 - 史蒂文斯渔业养护和管理法》（“马格努森 - 史蒂文斯法案”）更进一步，规定年度捕捞限额“不得超过其相应的 [管理委员会] 科学和统计委员会或同行审查做出的捕捞量建议”⁴⁰。虽然其他国家和地区也要求其决策者在作出渔业管理决定时考虑现有的最佳科学，但美国的独特之处在于明确要求科学推荐的渔获量即是年度渔获量的绝对上限。这有助于提高科学的影响力，并有助于减少过度捕捞。

39 50 C.F.R. § 600.315 国家标准 2- 信息。

40 《美国法典》16 § 1852(h)(6)；又见 50 C.F.R. § 600.310(b)(2)(v)。



<https://www.fisheries.noaa.gov/topic/laws-policies>



渔业管理计划 (FMP) 制定过程中的科学信息流 (SA 指种群评估)

根据美国的管理制度，“现有的最佳科学信息”是指“具有生物、生态、经济或社会性质的信息”⁴¹。法院对这一标准的解释是要求做决策要以当时可获得的信息的“彻底考量”为基础⁴²。美国国家海洋与大气管理局（NOAA）渔业局（也称为国家海洋渔业局）是负责监管美国渔业的联邦机构，在制定政策时，不得“忽视优越的数据”⁴³。不过，国家海洋渔业局不需要等待“完美或完全一致的数据”才采取行动⁴⁴。相反，即使存在一些科学上的不确定性和对渔业的短期不利影响，国家海洋渔业局反而可能采取更积极的措施来促进养护⁴⁵。

41 50 C.F.R. § 600.315 (b) (1)。

42 北卡罗来纳州渔业公司 诉古铁雷斯案，518 F. Supp. 2d 62, 85 (美国哥伦比亚特区联邦地区法院，2007)。

43 同上。

44 同上。

45 美国近海捕鱼协会诉戴利案，995 F. Supp. 1411, 1432 (美国佛罗里达中区联邦地区法院，1998年) (援引缅因州联合渔业公司诉戴利案，954 F. Supp. 383, 389.(美国缅因联邦地区法院，1997))。

控制捕捞死亡率的机制

渔业国为实现其可持续性目标而采取的养护措施主要有两种形式：产出控制和投入控制。

产出控制直接限制在一定时间内允许从一个渔业中捕获的鱼的总数或总重量。产出控制最常见的形式是前面提到的“总允许捕获量”或“总可捕量 TAC”，通常是指在某一特定时间段内从特定渔业捕获的一个或多个鱼种的重量或数量。其他常见的产出控制形式包括对休闲渔业活动中可带回上岸的渔获个数限制以及副渔获物限制等。

虽然产出控制直接限制渔获量，但投入控制也可以通过限制商业渔民可能采用的捕捞强度、类型和努力量间接地做到这一点。常见的投入措施有通过许可证或执照制度限制渔民的人数，限制渔船的大小和能力，规定网具的长度和网目大小，限制捕鱼活动的区域和时间，以及管制渔具的使用。

白皮书中所讨论的几种管理制度都结合了产出和投入控制机制，大多数制度都要求 TAC。控制措施如何结合使用依据不同渔业而定。

《海洋法公约》

《海洋法公约》第 61 条规定“沿海国应决定其专属经济区内生物资源的可捕量。”⁴⁶ 《海洋法公约》没有规定成员国必须采取何种具体措施来实现这一“可捕量”，但第 62 条指出，沿海国可以实施“养护措施”，以管制其专属经济区内的渔业活动，这种养护措施可包括产出和投入控制。例如，第 62(4) 条规定，沿海成员国除其他外，可“向渔民、渔船和捕捞装备颁发许可证”、“确定渔获量的限额”、“规定捕捞季节和区域”、“可使用渔具的类型、大小和数量”、以及“渔船的类型、大小和数目”以及“确定可捕鱼类和其他鱼种的年龄和大小。”⁴⁷

澳大利亚

澳大利亚使用产出和投入控制措施相结合的方式管理其渔业。在澳大利亚，“产出控制”是指“限制捕捞产出的管理措施，包括捕获量、捕捞鱼种和这些鱼种的大小”，而“投入控制”是指“限制捕捞活动的管理措施，例如，谁捕鱼（许可证限制）、哪里捕鱼（禁渔区）、何时捕鱼（禁渔期）或怎样捕鱼（渔具限制）⁴⁸。

在澳大利亚，最重要的产出控制措施之一是根据在某一时期从一个渔业能获取的某一特定鱼种的数量来确定 TAC⁴⁹。对有些渔业来说，TAC 是以个别可转让配额（ITQ）的形式实施的。ITQ 制度把一个特定的鱼种或鱼类种群在一个渔季的 TAC 分配给个人持有者。ITQs 是完全可转让的，

⁴⁶ 《海洋法公约》，前注 2，第 61 条。

⁴⁷ 同上，第 62 条。

⁴⁸ 《关于执行英联邦渔业捕捞策略政策的准则》，前注 9，第 69 和 70

⁴⁹ 同上，第 72 页。

可以出售或租赁给其他人⁵⁰。

澳大利亚的一些渔业还采用了一种称为“总可捕捞努力量”的投入控制，其中规定了在渔季中可用于渔业的渔具的类型和数量⁵¹。

举例来说，西部金枪鱼和旗鱼渔业、小型中上层渔业以及南部和东部有鳍鱼和鲨鱼渔业都是通过限制某些鱼种的渔获量、限制可能从事商业捕捞的船舶数量和规范船舶可能携带的捕捞渔具的类型来管理的⁵²。南部鱿鱼钩钓渔业则是通过限制捕捞努力量来管理的，包括限制允许在该地区捕鱼的船舶数量，规范它们可以使用的渔具，但没有渔获量限制⁵³。在其他渔业中，有限准入⁵⁴，和禁渔区⁵⁵，等管理措施也与对捕捞量限额或捕捞努力量限额相结合使用。

新西兰

同样，新西兰也采用投入和产出控制相结合的办法来管理其渔业。新西兰渔业管理制度的一个核心特点是它的“配额管理制度”，或称 QMS⁵⁶。QMS 是一个基于权利的管理系统，它依赖于 TAC 和 ITQ。初级产业部部长为每种商业捕捞的渔业规定了一个每年或渔季的 TAC 和一个次级的“商业捕捞允许总量”，即“TACC”⁵⁷。TACC 然后通过 ITQ 制度分配给个体商业渔民，可分割和转让产权。虽然 ITQ 持有人每年在渔业中享有捕捞一定数量渔获的永久权利，渔民实际上被允许的捕捞量在每年或每个渔季的开始时新的 TACC 设定后进行更新⁵⁸。下图说明了 QMS 体系：

50 见 F. Meany, 《将个人可转让配额引入南方蓝鳍金枪鱼渔业澳大利亚部分》，联合国粮农组织, <http://www.fao.org/docrep/pdf/004/y2684e/y2684e18.pdf>。

51 见, 例如, 2018 年南方鱿鱼钩钓渔业 (总可捕捞努力量) 确定 (2018 年 11 月 7 日) (由 AFMA 发布, 并确定南部鱿鱼钩钓渔业 2019 年捕鱼年的总可捕捞努力量), 可在 <https://www.legislation.gov.au/Details/F2018L01558> (最后一次访问 2019 年 2 月 14 日)。

52 见 <https://www.afma.gov.au/fisheries/western-tuna-and-billfish-fishery> 的西部金枪鱼和旗鱼渔业管理概况 (最近一次访问于 2019 年 2 月 4 日); AFMA, 小型中上层渔业管理概况: <https://www.afma.gov.au/fisheries/small-pelagic-fishery> (最近一次访问 2019 年 2 月 4 日); <https://www.afma.gov.au/fisheries/southern-eastern-scalefish-shark-fishery>, 南部和东部有鳞渔业和鲨鱼渔业管理概况 (最近一次访问于 2019 年 2 月 4 日)。

53 南方鱿鱼钩钓渔业管理概述, AFMA, <http://www.afma.gov.au/fisheries/southern-squid-jig-fishery> (上一次访问 2 月 4 日)。

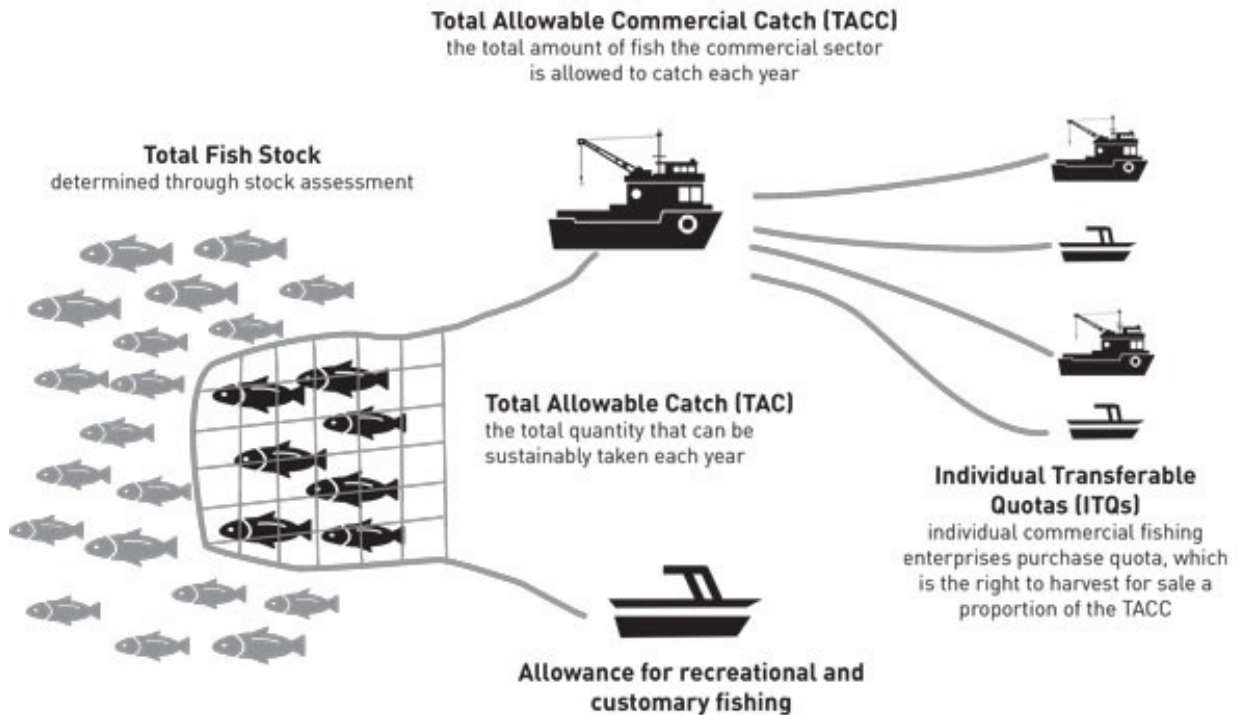
54 1994 年《澳大利亚渔业资源管理法》，第 58 条（“管理计划”可能“限制可以授予的授权数量，或者规定不得再授予授权”）。有限进入是一种常见的投入管理工具，只允许固定数量的经营者在某一特定渔业中捕鱼，新的经营者只能通过购买现有权利进入渔业。澳大利亚是在 1960 年代和 1970 年代率先将有限进入作为投入控制措施的国家 / 区域之一。Corbett A. Grainger & Dominic P. Parker, 渔业改革中的政治经济，年度回顾 5。资源经济学 369, 373 (2013)，可见于 <https://aae.wisc.edu/dparker5/papers/Politicalreform2013.pdf>。

55 见 1991 年《澳大利亚渔业管理法》，第 41A 条。

56 见“从新西兰学习”，前注 37，第 11 页。

57 新西兰 1996 年《渔业法》，第 4 部分。另见配额管理制度，新西兰渔业，<https://www.Fisheries.govt.nz/law-and-policy/legal-overviews/Fisheries/Quota-Management-System/> (上次访问日期为 2019 年 2 月 5 日)。

58 一般见“从新西兰学习”，前注 37，见第 37 页。



<https://www.mpi.govt.nz/law-and-policy/legal-overviews/fisheries/quota-management-system/>

除 QMS 外，新西兰渔业还采用其他更多的技术、产出和投入措施。有些渔业禁止捕获小于一定尺寸或年龄的某些鱼种⁵⁹。有些渔业限制使用破坏性渔具和方法⁶⁰。例如，商业渔民不得使用网目尺寸小于捕捞最小长度有鳍鱼类所需网目的渔网⁶¹。在某些关闭的海底山地区，拖网是被完全禁止的⁶²。

新西兰也利用关闭渔业的措施。2018 年，新西兰渔业部宣布，南部扇贝渔业将暂时关闭，无论是商业还是休闲渔业，以保护渔业的可持续性⁶³。

与澳大利亚一般情况下允许丢弃不同，新西兰的“禁止丢弃”的规定一般禁止商业渔民丢弃配额管理制度中的渔获物。例外情况是：(1) 鱼的大小在法定尺寸以下，在这种情况下，必须立即将鱼放回大海，不管是活的还是死的；或 (2) 该鱼被丢海里后生存率很高，而且要在捕获后尽快送回海里⁶⁴。

59 一般见《新西兰渔业管理概况》，新西兰渔业，<https://www.Fisheries.govt.nz/protection-and-response/sustainable-Fisheries/strengthening-Fisheries-Management/managing-our-catches/#manage-com-fishing>（上次访问日期为 2019 年 2 月 4 日）。

60 见同上。

61 2001 年《新西兰渔业（商业捕鱼）条例》，第 31 条。

62 同上，第 73 条。

63 新西兰渔业署临时停止南部扇贝 (SCA 7) 渔业项目（2018 年 7 月 6 日），<https://www.mpi.govt.nz/news-and-resources/consultations/temporary-closure-of-the-southern-scallop-sca-7-fishery-2/>（上次访问日期为 2019 年 2 月 4 日）。

64 1996 年《新西兰渔业法》，第 72 节；附表 6。又见 Anastasia Telesetsky，面向未来的渔业：为新西兰可持续渔业解决废弃物和增加出口价值问题（2016 年 8 月），22-25 页，available at <http://fulbright.org.nz/wp-content/uploads/2016/08/Print-ready-Anastasia-Telesetsky-Axford-report.pdf>（上次访问日期 2019 年 2 月 12 日）；向新西兰学习，前注 35，50-51 页。

欧盟

欧盟通过 TAC、配额、捕捞努力和技术措施管理渔业⁶⁵。TAC，在欧盟也称为捕鱼机会⁶⁶，指某一年中可从特定种群中捕捞的最大量。大部分商业鱼类种群每年都会被设定 TAC⁶⁷，然后以国家配额的形式在欧盟成员国之间进行分配。与澳大利亚或新西兰不同的是，欧盟并没有将捕鱼权分配给个体渔民。相反，每个成员国可以自行决定如何将这此捕鱼机会分配给其渔民和悬挂其国旗的船只。无论成员国选择了哪种方式分配捕鱼机会，它都有责任确保渔获量不超过欧盟规定的最高水平⁶⁸。

欧盟还采取了广泛的投入控制，以限制投入其渔业的努力。这些限制规定在一套广泛的规则中，规定了渔民如何、在何地 and 何时捕鱼。具体来说，它们包括网具最小网目尺寸、禁渔区域和季节、网具设计和使用规范以及最小上岸尺寸等措施⁶⁹。对于一些鱼类种群，在某一地理区域内，船队受到最大捕捞努力的限制。与 TAC 一样，最大捕捞努力量一般也分配给各个成员国，成员国可根据欧盟的立法和规定，自行决定如何将捕捞努力分配给悬挂其国旗的船只⁷⁰。

美国

与澳大利亚和新西兰非常相似，美国通过产出控制工具（主要是每个联邦管理的渔业的 TAC 以及副渔获物和鱼类尺寸大小的限制）以及投入控制工具（包括渔具限制、禁渔区、季节性关闭以及持有量限制⁷¹）相结合的方式管理渔业。每个联邦管理的渔业都必须设定“年度捕获量限制”（即年度 TAC）（除了少数短周期鱼种不受这一要求限制），这也成为控制这些被密集开发的鱼种的捕捞死亡率的首要机制。

美国划分为八个渔业管理区域，每个区域都有一个区域渔业管理委员会，为该区域的渔业制定管理政策⁷²。

65 理事会条例（欧共体）2009 年 11 月 20 日第 1124/2009 号，鉴于 (10)，可见于 <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:343:0001:0050:EN:PDF>（“欧共体一级的渔业资源管理特别以总可捕量、配额、努力制度和技术措施为基础。应采取适当步骤，确保成员国采取必要措施，有效地执行这些管理措施。”）。例如，见理事会条例（欧盟）2018 年 1 月 23 日第 2018/120 号，将某些鱼类种群和鱼类种群群体 2018 年的捕捞机会确定，见 <https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX:32018R0120120>（上次访问日期为 2019 年 2 月 4 日）。

66 见欧盟管制条例，鉴于 (22)。

67 例如，见欧共体，《委员会提议 2019 年大西洋和北海捕捞机会》（2018 年 11 月 7 日），http://europa.eu/rapid/press-release_IP-18-6301_en.htm（上次访问日期为 2019 年 2 月 12 日）。

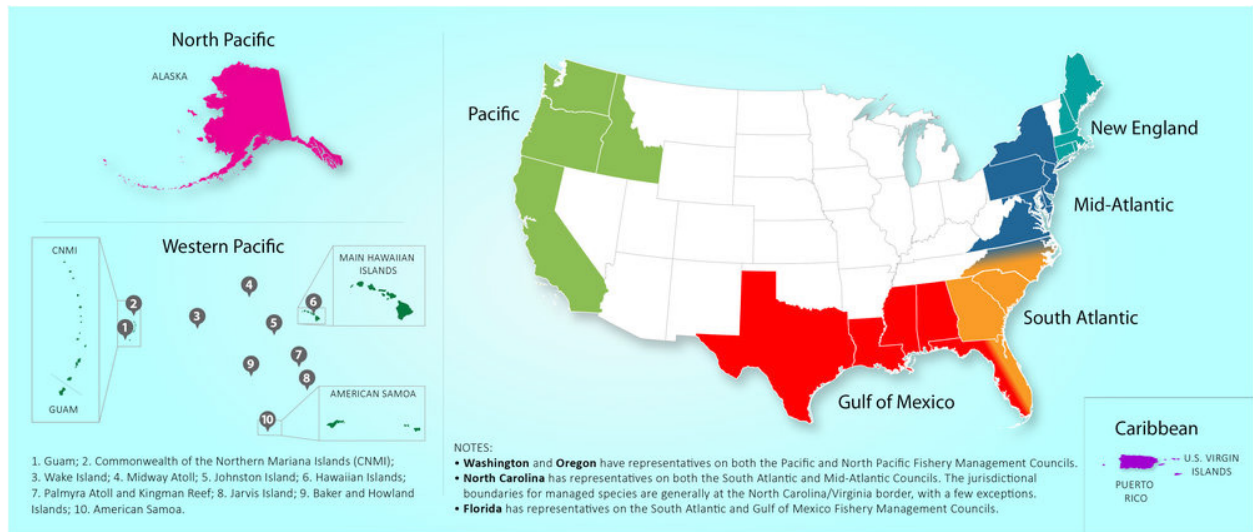
68 欧盟渔业配额介绍，欧盟渔业，https://ec.europa.eu/Fisheries/cfp/Fishing_rules/tacs_en（上次访问日期为 2019 年 2 月 5 日）。

69 技术措施介绍，欧盟渔业，https://ec.europa.eu/Fisheries/cfp/fishing_rules/Technical_Measures_en（上次访问日期为 2019 年 2 月 4 日）。

70 例如，见理事会条例（欧共体）2007 年 6 月 11 日第 676/2007 号，可见于：<https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2007R0676:20110101:EN:PDF>（上次访问日期为 2019 年 2 月 4 日）。

71 例如，见 50 C.F.R. § 622.38；日限是指一个人可以在单日内合法地保存的某一特定种类和大小的鱼、贝或海藻的最大数量或磅。占有量限制是指在场地或在途中每日允许占有的数量。又见鱼的日渔获量限制与鱼的占有量限制有什么区别？华盛顿渔业及野生生物部，<https://wdfw.wa.gov/help/questions/49/What+is+the+difference+between+the+daily+catch+limit+and+the+possession+limit+for+fish%3F>（上次访问时间为 2019 年 2 月 4 日）。

72 见 16 U.S.C. 1852。



@<http://www.fisherycouncils.org/>

例如，在北太平洋区域阿拉斯加水域进行的商业捕捞活动除受到禁止某些副渔获物、渔场关闭、渔季限制和渔具限制等特定限制外，还受到诸如“捕捞限制”和“最大可保留数量”等“一般限制”⁷³。

与澳大利亚和新西兰一样，美国在一些渔业中采用了个体渔业配额，作为管理措施对经济和社会影响的一种机制，称为“有限准入特权”，个体捕捞配额被记录在联邦许可证中，授权其持有者捕捞特定数量的鱼，通常可通过出售或租赁转让⁷⁴。有些渔业使用“船组”，即将捕获量分配给一组渔民自我管理，而不是个人⁷⁵。

⁷³ 50 C.F.R. 679 部分。

⁷⁴ 《美国法典》16 § 1802(26), 1853a(7)。

⁷⁵ 根据《马格努森-史蒂文斯渔业养护和管理法》分配渔业捕获量：原则和实践，美国国家海洋渔业局（2012年2月），<https://repository.library.noaa.gov/view/NOAA/4117>（最后一次访问时间为2019年2月12日）。

许可证、执照和船舶登记⁷⁶

如上文所述，在本白皮书所讨论的所有管理制度中，许可制度、许可证和船舶登记制度都是重要的投入控制。每个制度都使用许可证或登记制度来管制可能从事商业捕鱼的船只。这些制度还对可能通过许可证制度从事不同类型商业捕捞活动的人施加限制。另外，本文所讨论的所有管理制度都实施了某种形式的购鱼许可证制度，以规范和限制谁可以购买渔获。

《海洋法公约》

《海洋法公约》并不要求其成员采用许可或执照制度或其他具体的投入控制。然而，《海洋法公约》的确考虑到沿海国使用“向渔民、渔船和捕捞设备颁发许可证”来管理其渔业。

澳大利亚

澳大利亚依靠许可制度来管理其渔业⁷⁷。许可证可授权其持有人使用渔船从事商业捕捞、休闲捕鱼或鱼类加工⁷⁸。澳大利亚的捕鱼许可证通常附带各种条件的限制，例如对获准捕捞的鱼的种群和数量、捕捞频率、作业地区、捕捞方法和渔具的使用，以及许可证的使用期限。许可证的有效期限最长为五年，但大多数渔业限制为一年，届时持证者可申请延期⁷⁹。商业渔民在商业渔船上担任船长、船员和工程师之前，必须取得资格证书⁸⁰。

一些渔业在各自的渔业管理计划中制定了自己的规则和政策。获准在某一特定渔场捕鱼的许可证持有人必须遵守管理计划中规定的任何其他条件⁸¹。在澳大利亚，捕鱼许可证一般允许由一个人转让给另一个人⁸²。

由于许可证是发给在澳大利亚境内的人而非船只，所以只要船只符合适用的条件，许可证持有人可以随时更换船只⁸³。在澳大利亚水域捕捞的渔船没有统一的登记要求，但是，所有希望在公海捕鱼的人都必须向 AFMA 登记其渔船⁸⁴。

如果鱼类加工者、批发商和零售商想收购和销售十个指定澳大利亚渔场中的渔获，他们必须持有购买许可证⁸⁵。这些渔业包括南部蓝鳍金枪鱼渔业、珊瑚海渔业、南部和东部有鳞鱼和鲨鱼

76 在不同的监管制度之间，“license”和“permit”这两个术语在概念上并没有一致的区别。每个监管制度都使用自己的地方术语，白皮书采用了适用的监管制度所采用的同样术语。

77 澳大利亚渔业管理法，1991年，第32(1)条。

78 同上，第32(4)条。

79 捕鱼权和许可证介绍，AFMA，<https://www.AFMA.gov.au/fisheries-services/Fishing-Rights-Permits>（上次访问日期为2019年2月4日）。

80 见澳大利亚商业渔民，澳大利亚海事安全局。（最近一次访问日期为2019年2月4日），<https://www.amsa.gov.au/audiences/commercial-fisher>。

81 澳大利亚渔业管理法，1991年，第32(5)-(7)条。

82 同上，第32A条。

83 同上，第32(1C)条。

84 同上，第4(A)页。

85 同上，第6章，第2分节；《1992年澳大利亚渔业管理条例》，第4章，第2分节。

渔业以及东部金枪鱼和旗鱼渔业⁸⁶。在需要密切监测某些管理规定有效性的渔场，一般都需要获得渔获收购许可证。例如，AFMA 向东部金枪鱼和旗鱼渔业实施了购买许可证制度，以监测蓝枪鱼和黑枪鱼禁令的实施情况和掌握这些鱼的上岸情况⁸⁷。渔获收购许可证的有效期一般为 12 个月⁸⁸。

新西兰

新西兰采用了与澳大利亚基本相似的捕捞许可证制度。与澳大利亚的情况一样，渔民在新西兰水域从事商业捕捞活动需要有捕捞许可证⁸⁹。这种许可证的附带条件有很多种，包括允许捕捞的种群、区域和方法、可使用的船只、渔具的类型和数量、捕捞或处理方法、上岸地点和捕捞时间⁹⁰。此外，申请捕捞许可证的人可能必须提供一定数额的第三方担保或保证金⁹¹。初级产业部有一个许可证登记处，记录有关每个捕捞许可证的相关资料⁹²。但是，与澳大利亚不同的是，新西兰法律禁止持有捕捞许可证的人将许可证转让给他人⁹³。

就渔船登记而言，新西兰要求所有用于商业捕鱼的船只必须在“渔船登记册”上登记，比澳大利亚要求更高⁹⁴。

根据新西兰法律，只有领有执照的捕鱼者才被允许接受出售的鱼。除少数例外，商业捕鱼者必须将捕获的鱼卖给经批准的持有执照的鱼类收购者⁹⁵。

欧盟

欧盟规定，渔船必须取得捕捞许可证才能在欧盟水域从事商业捕鱼活动⁹⁶。欧盟授权其成员国根据欧盟立法和规定发放和管理这些许可证⁹⁷。根据欧盟法律，每艘船必须悬挂成员国的国旗，并在欧盟的“船队登记册”上登记⁹⁸。每艘船都有一个欧洲共同体船队注册号，使船只易于识别和搜索⁹⁹。

为了取得和持有捕捞许可证，船舶必须遵守关于渔船“识别、技术特性和装配”的最低要求¹⁰⁰。然而，欧盟并不对许可证附加有关鱼类种群、区域或渔具的具体条件。欧盟也不颁发个人捕捞许可证或渔获收购许可证，这些方面由成员国自己来管理¹⁰¹。

86 渔业权和许可介绍，前注 79。

87 澳大利亚渔业管理条例（修正案）1997 年，前注 79。

88 渔业权和许可介绍，前注 79。

89 1996 年新西兰渔业法，第 6 部分 另见 <https://www.fishserve.co.nz/information/permits>。

90 1996 年新西兰渔业法，第 92 条。

91 同上，第 91(5) 条。

92 同上，第 98、100、297 条。

93 同上，第 89(10) 条。

94 同上，第 103-113A 条。

95 新西兰渔业公司（有许可证的捕鱼者）1997 年条例，第 3 条。

96 欧盟管制条例，鉴于（13）。

97 见同上，第 6(5) 条。

98 欧盟委员会执行条例第 2017/218 号关于渔业船队登记。

99 NeT 船队登记系统，<http://ec.europa.eu/fisheries/Fleet/index.cfm>（上次访问日期为 2019 年 2 月 4 日）。

100 欧盟《管制条例》第 4(9) 条。

101 见欧盟《管制条例》。

美国

美国也利用许可证和执照制度来管制捕鱼。然而，与澳大利亚或新西兰不同，美国没有全国性的统一的许可证或执照制度。相反，美国国家海洋渔业局为该国的八个管理区域分别设立许可证和执照的要求¹⁰²。这些要求不仅因地区而异，而且往往依每个渔业和鱼种不同。例如，在大西洋、加勒比、墨西哥湾和南大西洋区域，所有商业渔船都必须有商业船只许可证¹⁰³。在美国西海岸地区，要在加利福尼亚州、俄勒冈州和华盛顿州捕捞高度洄游的鱼种，必须获得许可证，才能使用特定的渔具进行捕捞。¹⁰⁴

根据渔业和鱼种的不同，美国的渔船和经营者经常被要求拥有多份许可证或执照。例如，一艘捕捞阿拉斯加离岸专属经济区（包括北太平洋地区）的底栖鱼类的渔船，必须同时拥有联邦渔业许可证和特别的“底层鱼类许可证”¹⁰⁵。

美国还要求某些鱼类交易商和收购商必须获得许可证并遵守某些报告要求¹⁰⁶。有些地区要求商业捕捞船舶只能将渔获卖给持有联邦许可证的鱼商¹⁰⁷。例如，在大西洋沿岸渔业中，收购商必须持有许可证才能购买、持有或接受美国龙虾用于商业目的¹⁰⁸。在大西洋地区，渔民只能将捕获的鱼卖给有联邦许可的商人¹⁰⁹。现实情况中，每个区域持有联邦许可的商业捕鱼船通常也只将捕获的鱼卖给联邦允许的鱼商。

102 见许可，美国国家海洋渔业局，<https://www.Fisheries.NOAA.gov/Permits-and-forms#fishing-seafood>（上次访问日期为 2019 年 2 月 4 日）。

103 50 C.F.R. § 622.4；见渔业许可证，美国国家海洋渔业局大西洋区域 <https://www.GreaterAtlantic.Fisheries.NOAA.gov/aps/Permits/Fishing/index.html>（上次访问日期为 2019 年 2 月 14 日）。

104 50 C.F.R. § 600.707。

105 50 C.F.R. § 679.4。

106 见如联邦许可的海鲜经销商报告要求（2014 年 10 月 1 日），美国国家海洋渔业局 <https://www.greateratlantic.fisheries.noaa.gov/aps/dealer/fedseafooddealerreportrequirements.pdf>；50 C.F.R. § § 648.7, 697.6 & 635.5

107 见如 50 C.F.R. 648.14。

108 50 C.F.R. § 697.6(a)。

109 见《一般捕捞许可证》，前注 103。

监测机制

有效的监管制度总是利用各种不同的机制来监测其渔业，并核实其参与者，即商业和休闲渔业渔民、加工商和批发商，是否遵守规定（例如，禁渔区和禁渔期、渔获量限制和渔具限制）。这些机制包括船舶监测系统（VMS）、纸质和电子捕捞日志、海上观察员、船上电子监测系统以及在码头对船只搭载物和渔获物卸载过程进行监测。

《海洋法公约》

《海洋法公约》要求成员国通过法律和条例，确保其船只遵守适用的国际渔业规则 and 标准¹¹⁰。《海洋法公约》将这种监测机制的具体设计和采纳留给成员国¹¹¹。

澳大利亚

AFMA 负责监测澳大利亚的渔业。为了做到这一点，AFMA 使用了一系列机制，这些机制通常可分为两类：渔获物的追踪和船只的追踪。



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追踪渔获物，AFMA 使用捕捞日志、电子监测（“电子监察”）、海上观察员及渔获物处理记录¹¹²。所有在澳大利亚作业的渔船都必须填写捕捞日志，记录捕捞活动的时间和地点、所使用的渔具类型、渔获物的构成以及与受威胁、濒危或受保护物种之间的相互作用等信息，并向 AFMA 提交。在有些渔业中，使用特定渔具和渔法捕捞的渔民可能需要在纸质日志外同时使用电子捕捞

110 见联合国海洋法公约，前注 2，第 217 条。

111 见同上。

112 见国内合规，AFMA，<https://afma.govcms.gov.au/domestic-compliance>（最后一次访问于 2019 年 2 月 14 日）。

日志(“电子日志”)或直接使用电子捕捞日志。例如,自2019年起,在珊瑚海渔业和小型中上层渔业中,在一个渔季内用线或者拖网捕捞50天或以上的渔民必须使用电子日志而非纸质日志¹¹³。

AFMA 捕捞日志的要求得到电子监测的进一步补充。电子监测是一个由机载摄像机和传感器组成的系统,用于监测和记录捕捞活动和船只位置。这些电子监测系统使 AFMA 能够独立核实日志中报告的数据。¹¹⁴ 现在,澳大利亚渔业中的大多数商业渔船都必须进行电子监测,安装了电子监测系统的渔船不需要携带观察员¹¹⁵。

对于那些没有电子监测系统的渔船,AFMA 可以在事先合理通知的情况下,要求这些船只在指定时间内携带海上观察员。被提名接受观察员的渔船必须确保观察员安全登船,并必须免费向观察员提供足够的食物、住宿和医疗设施¹¹⁶。观察员还必须在履行职责的合理必要范围内进入船舶的所有部分,船舶的任何经营人或船员不得在观察员履行职责时攻击、阻挠、抗拒、拖延、拒绝登船、恐吓或干扰他或她¹¹⁷。

在受捕捞配额限制的渔业中,渔民必须在上岸时完成处理记录,详细说明所捕获的鱼种及其准确的重量¹¹⁸。在某些渔业中,渔民可能需要记录更多的信息,例如装有鱼的箱子数量、上岸鱼类的加工状况以及渔获物中鲨鱼尸体的数量¹¹⁹。

渔民向 AFMA 和渔获收购者(可能是鱼类加工商、批发商或零售鱼市场)提供其处置记录的副本。收购者记录鱼类的种类和重量,在表格上签名,并将其提交给 AFMA¹²⁰。不受配额限制的渔业也可能需要渔获量处置记录,以协助种群评估和其他目的¹²¹。

商业渔船还必须安装跟踪装置,作为 AFMA 卫星船只监测系统(VMS)的一部分,该系统记录并向 AFMA 传输与船只位置、航向和速度有关的数据。AFMA 在很大程度上依赖 VMS 来跟踪渔船的移动情况,并核实其遵守渔业管理规则的情况¹²²。

113 1991 年《渔业管理法》,第 42 条。(“与捕捞日志和提供回报有关的决定”);2017 年渔业捕捞日志决定,<https://www.legislation.gov.au/Details/F2017L00446>。参见渔业服务:捕捞日志,AFMA,<http://www.afma.gov.au/fisheries-services/logbooks/>。

114 电子监测项目,AFMA,<https://www.AFMA.gov.au/Monitoring-enforcement/Electronic-Monitoring-Program>。另见关于渔业中增长的电子监测技术的分类,Mark Michelin, Matthew Elliott Max Bucher, 加州环境协会, Mark Zimring, Mike Sweeney, 大自然保护协会, https://www.nature.org/content/dam/tnc/nature/en/documents/Catalyzing_Growth_of_Electronic_Monitoring_in_Fisheries_9-10-2018.pdf(最后浏览于2019年2月5日)(“澳大利亚第一个电子监测系统起源于2005年南大洋中的一条渔船,电子监控系统被用于监控刺网,陷阱捕鱼,与金枪鱼及旗鱼渔业。此系统现在已经用于75艘船,并期望在未来的5-10年覆盖大部分船只”)。

115 电子监测项目,前注114。

116 观察员项目,AFMA,<https://www.afma.gov.au/monitoring-enforcement/observer-program> (最后访问于2019年2月22日)。

117 1991年澳大利亚《渔业管理法》,第6部分。1992年澳大利亚《渔业管理条例》,第7部分。另见观察员项目,前注116。

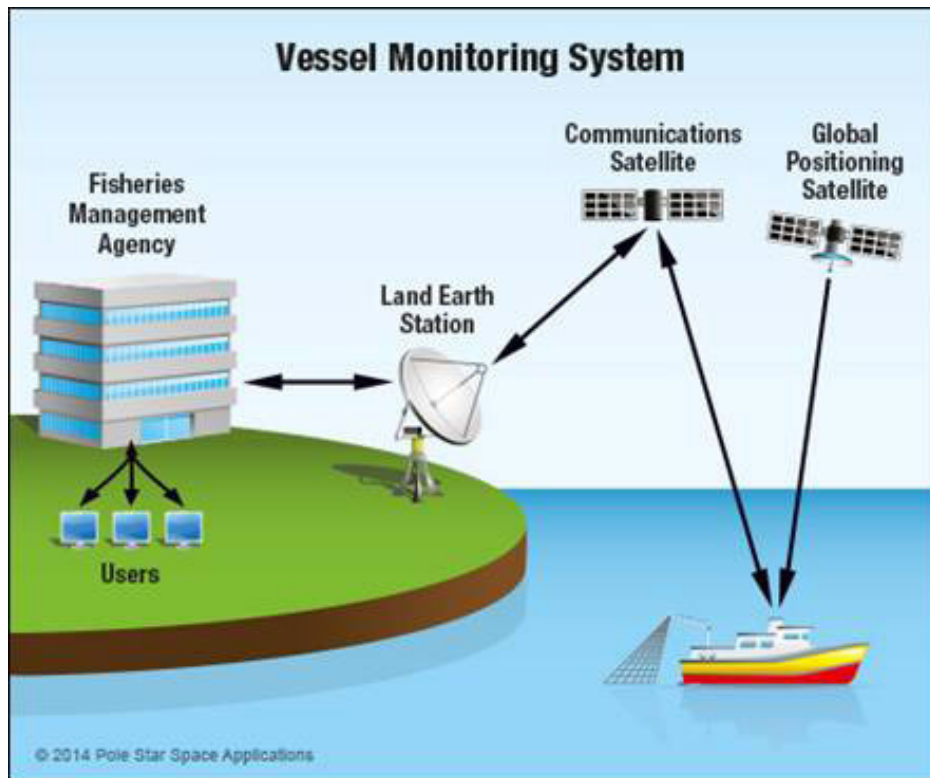
118 捕捞处理记录,AFMA,<https://www.AFMA.gov.au/monitoring-enforcement/Catch-Disposal-Records> (最后访问于2019年2月22日)。

119 同上。

120 同上。

121 同上。

122 1991年澳大利亚《渔业管理法》,条款18(3)(g)(iii)“国家对悬挂其国旗的船舶所应采取的措施应包括…船舶监测系统的开发和实施,包括适当时…卫星传输系统”;《渔船卫星监测》,AFMA,<http://www.AFMA.gov.au/Monitoring-enforcement/Satellite-Monitoring-Fishing-Boats/>(最近访问日期为2019年2月4日);船只监测系统要求,AFMA,<http://www.AFMA.gov.au/fisheries-services/Vessel-Monitoring/>(上次访问日期2019年2月4日)。



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新西兰

新西兰渔业署 (FNZ) 是新西兰初级工业部的一个机构，负责管理新西兰的渔业。FNZ 正在开发一个完全数字化的渔获量报告系统，由电子捕捞日志、全球位置报告和船上电子监测组成。这些系统是为了相互重叠和加强而设计的。例如，全球定位系统允许 FNZ 核实在电子日志上披露的关于何时何地捕鱼的信息，而船上的摄像机允许 FNZ 核实电子渔获量报告是否准确¹²³。

持有某些许可证进行捕捞的渔船必须有船上的摄像头¹²⁴。到 2019 年底，所有商业渔民都必须向 FNZ 提供渔获量和位置的电子报告¹²⁵。根据电子日志要求，渔民必须在一天结束前以数字方式完成并向 FNZ 提交“事件报告”，即任何有关捕捞、加工、处理和 / 或上岸的活动¹²⁶。

新西兰的持有许可证的渔获收购者必须每月向 FNZ 提交“持证渔获收购者申报表”，详细说

123 一般见商业捕鱼电子监测，新西兰渔业署，<https://www.fisheries.govt.nz/protection-and-response/sustainable-fisheries/strengthening-fisheries-management/fisheries-change-programme/digital-monitoring-of-commercial-fishing/> (最后一次访问于 2019 年 2 月 14 日)；电子捕获和位置报告，新西兰渔业 <https://www.fisheries.govt.nz/protection-and-response/sustainable-fisheries/strengthening-fisheries-management/fisheries-change-programme/electronic-catch-and-position-reporting/> (最后一次访问于 2019 年 2 月 14 日)。

124 新西兰渔业 (对船只的电子监测) 《2019 年修订条例》；新西兰渔业 (对船只的电子监测) 《2017 年条例》。

125 电子监控更新——2018 年 12 月，新西兰渔业，<https://www.Fisheries.govt.nz/dmsdocument/32536/loggedIn> (上次访问时间是 2019 年 2 月 14 日)。

126 新西兰渔业 (报告) 条例 2017 年，第 1 部分。新西兰渔业 (报告) 《2018 年修订条例》，第 7 部分。

明上个月收到的鱼种类和数量，以及提供渔获的渔民的识别信息¹²⁷。《新西兰渔业法》还授权码头监测，监测人员可以检查和称量渔获，并核实商业渔民记录的关于渔获量、捕捞努力量和上岸的信息的准确性¹²⁸。

与澳大利亚一样，新西兰也利用船上观察员¹²⁹。FNZ 可选择在任何渔船上安排一名或多名观察员，并向渔民发出合理的事先通知。当 FNZ 发出通知时，渔船必须载运观察员并遵守有关规则，包括确保船只拥有观察员履行其职责所需的设备；免费提供食物和食宿；允许观察员查阅信息、记录和船上所有区域¹³⁰。

欧盟

在欧盟，渔业监测机制是“共同渔业政策”所包括的“控制”制度的一部分。控制制度载于理事会条例第 1224/2009 号，该条例建立了共同体管制制度，以确保遵守“共同渔业政策”的规则，也称为“控制条例”¹³¹。自 2010 年生效以来，“控制条例”在为欧盟成员国提供最低限度监测要求方面发挥了关键作用¹³²。下文将讨论这些最低要求。

船舶监测系统 (VMS)：欧盟是世界上第一个要求对所有大型渔船进行 VMS 跟踪的区域¹³³。通过这一系统，渔业管理部门可以监测船只是否在许可的时间内在许可的地点捕鱼。欧盟所有成员国都必须安装使用船舶监测系统，以监测悬挂各自国旗的渔船。长度在 12 米或以上的渔船必须在船上安装能够自动发射位置信息的装置，每两小时至少向渔业当局自动传送一次位置数据¹³⁴。

自动识别系统 (AIS)：AIS 是一个自主和连续的船只识别和监测系统，使渔船能够与附近的船只和渔业管理部门以电子化交换关于其识别、位置、航向和速度的数据¹³⁵。VMS 是基于卫星的，其设计目的是为监管目的确定船只的位置，而 AIS 则是用于态势感知和导航的船对船和岸对船实时通信¹³⁶。在欧盟，所有长度超过 15 米的渔船除配备渔船监测系统外，还必须配备 AIS。通过 AIS 收集的数据也可用于交叉核对渔业管理部门收集的其他数据¹³⁷。

船只探测系统 (VDS)：VDS 是另一种卫星系统，旨在探测船只在海上的位置¹³⁸。与 VMS 或 AIS 不同，VDS 依赖远程技术，该技术不要求船只操作特定的传输设备。VDS 可用来监视没有 VMS 或 AIS 设备或可能有意断开此类设备以避免监测的船只¹³⁹。成员国必须确保其渔业管理部门

127 新西兰渔业（报告）条例，2017 年，第 2 部分。

128 1996 年《新西兰渔业法》，第 300 章。

129 同上，第 12 部分。

130 同上。

131 欧盟渔业管制制度，欧盟渔业，https://ec.europa.eu/Fisheries/cfp/Control_en（上次访问日期为 2019 年 2 月 5 日）。

132 见欧共体新闻稿，共同渔业政策：委员会提议新规则以加强执法（2018 年 5 月 30 日），http://europa.eu/rapid/Press-Release_IP-18-3978_en.htm（上次访问日期为 2019 年 2 月 5 日）。

133 船舶监测系统 (VMS)，欧盟渔业，https://ec.europa.eu/fisheries/cfp/control/technologies/vms_en。

134 欧盟管制条例，第 9 条。另见欧盟委员会执行条例（欧盟）2011 年 4 月 8 日第 404/2011 号，规定了执行理事会条例（欧共体）第 1224/2009 号的详细规则，第 18-22 条 [下称执行条例]。

135 同上，第 4 条 (11)。

136 见美国国土部，AIS 如何与 VMS 进行比较和对比？，https://www.navcen.uscg.gov/pdf/AIS/Q_AIS_vs_VMS_Comparison.pdf（最后浏览于 2019 年 2 月 4 日）。

137 欧盟控制条例，第 10 条。

138 同上，第 4 条 (13)。

139 见农业和渔业部门，FISHREG，船舶监测系统（2007 年），http://ec.europa.eu/research/press/2007/maritime-briefing/pdf/43-vessel-detection-system-fisheries_en.pdf（最后浏览于 2019 年 2 月 5 日）。

具有使用 VDS 的技术能力，并鼓励它们使用 VDS 对从其他来源收到的位置数据进行交叉检查¹⁴⁰。

捕捞日志和申报：在欧盟，长度在 10 米或更长的渔船必须持有捕捞日志，并提交上岸和转运申报。长度在 12 米或以上的渔船必须以电子形式保存捕捞日志（也称为电子日志），并必须以电子方式向渔业管理部门提交上岸和转运申报¹⁴¹。应记录在捕捞日志中的资料包括：渔船的识别号码和名称；离港和抵达港口的日期；捕捞航次的持续时间；渔具的类型；所用网具的网目大小和网具尺寸；捕鱼作业的次数；渔获的日期；捕获的鱼种；渔获的区域；渔获日期；渔具的类型；渔网的网目大小和尺寸；捕捞作业的次数；渔获的日期；渔获的种类；渔获的日期；估计的每种鱼种的数量或重量，以及在适当情况下，任何鱼种超过 50 公斤以上的丢弃量。长度小于 10 米的渔船不要求有捕捞日志，在上岸时通过抽样对其进行监测¹⁴²。

海上船载观察员：与澳大利亚和新西兰一样，欧盟成员国内的渔业管理部门可确定需载有观察员的船只¹⁴³。渔船必须为观察员提供“适当的食宿”，便利他们的工作，避免干扰他们履行职责。职责包括核查船只的有关文件，记录船只的捕捞活动，完成观察员报告，以及向主管渔业部门报告任何严重侵权行为。

上岸义务¹⁴⁴：自 2015 年以来，欧盟逐步实施了一项上岸义务，要求商业渔民上岸、记录和统计所有捕捞到的渔获并将其计入适用的配额。例外的情况适用于对其增加选择性不切实际的鱼种、禁捕鱼种（若意外捕捞到，必须送回海里）、以及科学证据显示送回海里后存活率较高的鱼种。因此，上岸义务适用于有配额限制的鱼种，如鲑鱼，以及受最小上岸尺寸限制的鱼种，如金头鲷。上岸义务的目的是结束将利润较低鱼扔回海里的做法。事实证明，这种做法对鱼类种群有害，对海洋环境有害，对渔民来说也代价高昂¹⁴⁵。通过要求渔民上岸卸载、记录和统计所有渔获量，欧盟希望促进渔民采取更好的方法增加选择性，减少不必要的渔获，并消除这种丢弃的浪费行为¹⁴⁶。到 2019 年底，欧盟水域的所有商业渔业和在公海捕鱼的欧盟渔船都必须履行上岸义务。

指定港口和港口检查：对于某些敏感物种和大量上岸的渔获，欧盟成员国可指定数量有限的港口，这些港口需要设施较好，能够接收这些渔获¹⁴⁷。这提高了渔业管理部门监测和检查特定类型渔获物的能力。

140 欧盟控制条例，第 11 条。

141 同上。鉴于 (17) & (18)；第 14-15 条。

142 同上。第 16 条。

143 同上，第 73 条，并看 欧盟实施条例，第 93-96 条。

144 CFP2013，第 14-15 条。

145 海事与渔业部，EC，欧盟开始实施上岸的义务。（2015 年 3 月），https://ec.europa.eu/dgs/maritimeaffairs_fisheries/magazine/en/policy/eu-getting-board-landing-obligation（最后浏览于 2019 年 2 月 4 日）。

146 丢弃是将不需要的渔获返回海洋的做法，无论是死亡还是活着，因为它们的尺寸不足，渔民没有配额或没有市场需求。丢弃可能导致浪费，特别是在仅需要报告和记录渔获物的上岸部分的系统下。

147 欧盟控制条例，43 条。同看指定港口，欧盟渔业，https://ec.europa.eu/fisheries/cfp/control/designated_ports_en（最后访问与 2019 年 2 月 4 日）

美国

在美国，渔民和鱼类经销商都必须独立完成和提交捕捞记录，使美国国家海洋渔业局能够交叉核对和核实所记录的信息¹⁴⁸。捕捞日志需要记录的信息包括每个航次和每次收获的捕捞努力量、位置、渔获物和副渔获物。对于纸质捕捞日志，渔民保留一份副本，将一份副本交给鱼类经销商，并将另一份副本发送给监管机构。在收到鱼后，鱼类经销商必须记录有关渔获量、渔获来源的渔民和渔获的市场价格的信息。渔民和鱼类经销商各自的捕捞日志结合在一起形成了一张“航次票”，作为每个航次关于捕捞努力、位置和渔获量的完整记录¹⁴⁹。许多（尽管不是所有）渔业都要求鱼类经销商使用电子日志来报告生产和上岸数据¹⁵⁰。

与澳大利亚、新西兰和欧盟的对应机构一样，美国国家海洋渔业局应用 VMS 系统来监测商业渔船在美国的位置和移动情况¹⁵¹。其他监测机制在美国不同的渔区和不同的渔业中各有不同。例如，截至 2018 年 5 月，包括大西洋中上层延绳钓渔业在内的五个美国渔业中实施了电子监测，要求渔船安装摄像机和传感器，用以捕捉捕捞地点、渔获物和丢弃物的信息，并将这些数据传送给渔业监管机构¹⁵²。



©<https://www.st.nmfs.noaa.gov/advanced-technology/electronic-monitoring/em-er-explained>

148 148 Derek Southern, 美国海洋渔业电子捕捞报告：现状报告与建议。2-3页，eScholarship.org(2017年4月1日)，可见于<https://cloudfront.escholarship.org/dist/prd/content/qt7d14s9zv/qt7d14s9zv.pdf?t=p58jbs&nosplash=f258bc11e4e192f39d1859fcad19ed7c>（最终浏览于2019年2月14日）。

149 同上。

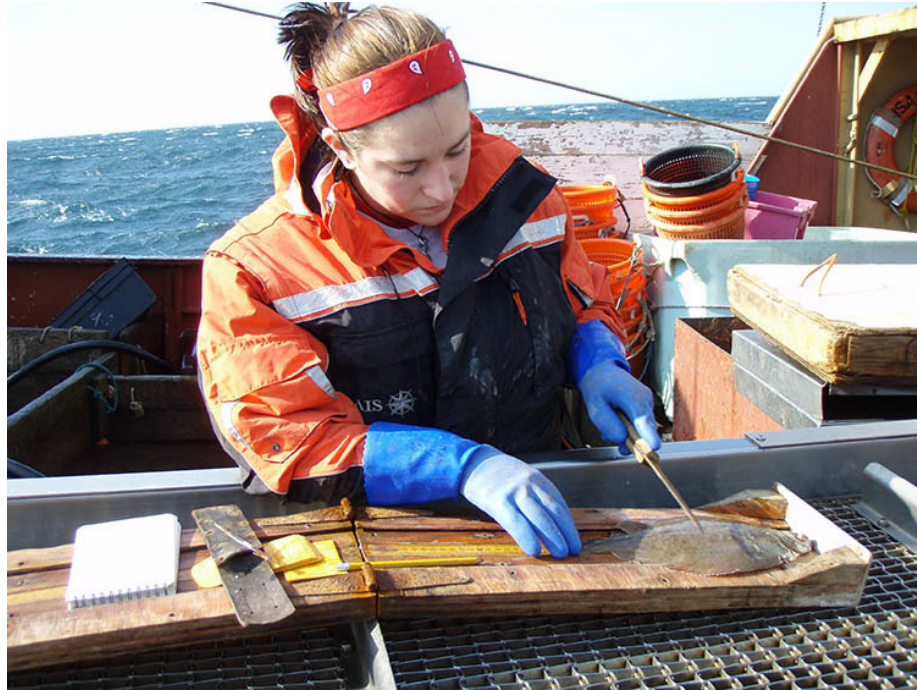
150 同上，于4。

151 船只监测，美国国家海洋渔业局，<https://www.fisheries.noaa.gov/national/fisheries-observers/vessel-monitoring>（最后浏览于2019年2月4日）。

152 电子监测，美国国家海洋渔业局，<https://www.fisheries.noaa.gov/national/fisheries-observers/electronic-monitoring>（最后浏览于2019年2月5日）。

一些渔业，如阿拉斯加的底栖鱼和大比目鱼渔业，要求商业渔船搭载海上观察员¹⁵³。在其他渔业中，根据监测需要、统计抽样协议和其他因素，将一定比例的观察员派到商业渔船上¹⁵⁴。

观察员从大西洋黄盖鲽身上收集鳞片样本。鳞片可以用来估计鱼的年龄。这一信息，再加上鱼类的长度，将增使种群评估更加可靠。



© <https://www.nefsc.noaa.gov/fsb/forms/>

153 见如《美国法典》16 § 1881b.

154 见 Samantha G. Brooke, 美国联邦渔业观察员项目：40 余年的独立数据收集，海洋渔业回顾 76，1-38 页（2015 年 1 月），可见于 <https://spo.nmfs.noaa.gov/sites/default/files/pdf-content/mfr7631.pdf>。

确保遵守的措施（执法）

本白皮书所讨论的每个国家和区域的监管制度都纳入了鼓励问责和制止违法行为的执法措施。渔业有关的违法行为通常受到行政处罚和民事处罚，从警告到罚款不等。最严重的违法行为会引发刑事起诉。

《海洋法公约》

《海洋法公约》没有具体规定应如何惩罚与渔业有关的违法行为。相反，《海洋法公约》允许其成员制定和执行自己的确保遵守措施。

澳大利亚

在澳大利亚，违反渔业条例的行为可处以行政、民事和刑事处罚¹⁵⁵。轻微违法，如对渔业造成最小影响的犯罪，属于轻微技术性质的犯罪，构成初犯，或可迅速处理的，可能只会引起口头警告。对于较严重的违规行为，违法者可收到正式的“英联邦渔业侵权通知”，要求违法者支付罚款¹⁵⁶。对于个别违法者，每次罚款不超过 2,520 澳元（约 1,800 美元）；对于公司违法者，每次罚款不超过 12,600 澳元（约 9,000 美元）¹⁵⁷。

渔业违法行为也可能影响到一个人的捕鱼权和捕捞条件。例如，如果渔民不支付某些费用、违反规则或法律以至于造成不可接受的影响、一贯不遵守规定或蓄意试图从违规行为中获得经济利益，该渔民的渔业权就有可能被中止或撤销¹⁵⁸。渔业监管机构还可以修改与捕捞许可证有关的条件，以确保违法者今后遵守规定¹⁵⁹。

在有可能产生严重影响的情况下，渔业管理人员也可指示渔船：(1) 停止渔业活动；(2) 被带到某一特定地点；和 / 或 (3) 停止开船，接受“海上”登船检查¹⁶⁰。最后，在有证据显示违反 1991 年《渔业管理法》，并且渔业管理机构认为起诉是阻止此人再进一步犯罪或遏制公众参与类似犯罪行为的最适当对策的情况下，渔业管理机构可将某些渔业犯罪案件移交刑事诉讼¹⁶¹。

新西兰

新西兰在很大程度上依赖没收作为一种执行手段。违法者可能被没收非法所得的渔获、出售这些鱼所得的收益、渔具或其他用于犯罪的资产设备，以及与违法有关的任何配额权¹⁶²。不履行某些报告义务的渔民和鱼类收购商的行为，被称为“侵权违法”，须缴纳高达 750 新西兰元（约

155 见 AFMA，国家合规与执法政策 2017，于 26-29。

156 1992 澳大利亚《渔业管理条例》，第 10 部分。

157 同上；新闻，AFMA，经营者面对渔业中上涨的罚款（2018 年 1 月 24 日），<https://www.afma.gov.au/operators-face-increased-fines-fisheries-offences>（最后浏览于 2019 年 2 月 12 日）。

158 1991 澳大利亚《渔业管理法》，38-39 段。

159 同上。

160 2013 澳大利亚海权法，69 段。

161 1992 澳大利亚《渔业管理条例》，9A 部分。同看 1992 澳大利亚《渔业管理条例》。

162 1996 澳大利亚渔业法，255A-255D 条款。

合 515 美元) 的“侵权费用”¹⁶³。例如, 未在捕鱼后 8 小时内完成处理报告, 可处以 400 新西兰元罚款。对于其他更严重的渔业违法, 罚款可从对此类轻微违法的最高罚款 5, 000 新西兰元 (约合 3, 433 美元), 如未将船只所有权变更通知监管机构, 到违反捕捞许可证条件可处以 100, 000 新西兰元 (约 69, 000 美元) 的罚款, 再到非法倾倒鱼类罚款可处 250, 000 新西兰元 (约 172, 000 美元) 的, 再到无许可的外国船只在新西兰水域捕鱼可处罚款为 500, 000 新西兰元 (约合 343, 000 美元)¹⁶⁴。有些犯罪行为, 如明知而作虚假陈述, 可根据新西兰刑法予以起诉, 最高可判处五年监禁¹⁶⁵。

欧盟

在欧盟, 针对具体国家的执法措施得到 2008 年 9 月 29 日 (欧共体) 理事会第 1005/2008 号条例 (“非法、无管制和未报告的捕捞活动条例”) 的补充, 该条例也称 “IUU 条例”, 旨在预防、阻止和消除非法、未报告和无管制的捕捞活动。“IUU 条例” 规定的执行措施和制裁只适用于 “严重侵权行为”。严重侵权行为包括:

- 无有效许可证捕鱼;
- 未报告与渔获量有关的数据;
- 在禁渔区捕鱼;
- 达到配额后捕鱼;
- 使用被禁止的渔具;
- 伪造船只标记;
- 阻挠检查员或观察员;
- 在违反适用条例的情况下上船、转运或捕捞未够大的鱼类。¹⁶⁶;

虽然 “IUU 条例” 规定最高处罚可为通过违法获得的渔业产品价值的五倍, 对严重侵权行为的具体制裁主要由成员国规定。如果在五年内多次发生严重侵权行为, “IUU 条例” 规定的制裁至少相当于所获得的渔业产品价值的八倍¹⁶⁷。“IUU 条例” 还要求成员国在实施这些制裁时考虑到损害的渔业资源和海洋环境价值。这类罚款还可辅之以其他措施, 包括:

- 警告;
- 渔船的扣押或暂时固定;
- 没收违禁渔具、渔获物或渔业产品;
- 捕鱼权的减少、中止或撤销¹⁶⁸。

163 2001 澳大利亚渔业 (侵权罪) 条例。

164 同上, 第252条。

165 同上, 第 260A条。

166 IUU 条例, 第3 与 42条。

167 同上, 第44条。

168 同上, 第45条。

除上述制裁外，还可对成员国的某些犯罪行为实施刑事制裁¹⁶⁹。另外，欧盟在其捕捞许可证制度方面建立了一个记分制度，每项严重的侵权行为都会导致预先设定的处罚点数从该船的许可证积分上扣除。一旦积分低于一定水平，许可证将被吊销¹⁷⁰。



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美国

在美国，《马格努森-史蒂文斯法》为与渔业有关的违法行为规定了四种基本的执法补救办法，按其严重程度依次为¹⁷¹：(1) 渔业官员在违法现场发出的罚单¹⁷²；(2) 民事罚款¹⁷³；(3) 没收船只、渔具、货物和渔获物或其公平市场价值¹⁷⁴；(四) 对所有主、经营者的刑事起诉¹⁷⁵。在适当情况下，这些补救办法可以合并适用。

169 同上，条款 44。

170 欧盟管制条例，鉴于 (40) (“制裁的制定应由严重侵权的记分制度补充，如果捕捞许可证持有人有一定数量的分数，应暂停捕鱼许可证，并对严重侵权行为实施制裁后再获得许可。”)；另见渔业中严重侵权记分系统，欧盟渔业。https://ec.europa.eu/fisheries/cfp/control/infringements_sanctions/point_system_en (最后浏览于 2019 年 2 月 22 日)。

171 50 C.F.R.600.740。

172 15 C.F.R.Pt.904，子部 E。

173 15 C.F.R.Pt.904，子部 B。

174 《美国法典》16 § 1860。

175 《美国法典》16 § 1859。

在评估处罚时，国家海洋和大气管理局（NOAA）考虑以下因素：指控的违法行为的性质、情况、范围和严重程度；指控的违法者的罪责程度；指控的违法者以往违法的历史；指控的违法者支付罚款的能力；以及司法可能要求的其他事项¹⁷⁶。根据《马格努森 - 史蒂文斯法》，罚款范围可从非故意和低级别的违法行为 2,000 美元的罚款，到对故意犯下严重违法行为（如篡改或歪曲 VMS 装置的数据）最高可罚 140,000 美元¹⁷⁷。

此外，无论是否施加民事和 / 或刑事处罚，如果渔民违反《马格努森 - 史蒂文斯法》的任何规定或以其他方式违反该法第 307 条所禁止的行为，NOAA 均可对许可证持有者实施制裁，撤销、暂停或拒绝颁发捕捞许可证，或对现有捕捞许可证施加附加条件和限制¹⁷⁸。

176 15 C.F.R. § 904.108(a). 另见美国国家海洋和大气局 Gen.Counsel, 民事行政处罚和制裁许可政策, 第三页, 2014 年 6 月 1 日, 【下文中称 NOAA 民事行政处罚】, 可见于 https://www.gc.noaa.gov/documents/Penalty%20Policy_FINAL_07012014_combo.pdf (最后访问于 2019 年 2 月 22 日)。

177 见美国国家海洋和大气局关于民事惩罚的政策, 前注 176, 在第 4, 23 和 35 页。

178 《美国法典》16 § 1858。

结论

《海洋法公约》、澳大利亚、新西兰、欧盟和美国采用的管理制度，为寻求维持或恢复其渔业的捕鱼国提供了范例。每一制度都规定了可持续性标准，并依靠现有的相关科学来制定和实施产出控制(如TAC)和投入控制(如限制商业捕捞许可证的数量)，以达到这一标准。这些制度使用一套监测系统来监测对管理的遵守情况和跟踪管理的成功情况，以及采取强有力的执法措施来惩罚和威慑违法者。这些共同特点极大地促进了这些管理制度在管理上的相对成功。

附件 1 报告分析的法律、条例、政策与准则

国际条约

- 《联合国海洋法公约》（1982）
- 《执行 1982 年 12 月 10 日〈联合国海洋法公约〉有关养护和管理跨界鱼类种群和高度洄游鱼类种群的规定的协定》（1995）

澳大利亚

法律和条例

- 《渔业行政法》 1991
- 《渔业管理法》 1991
- 《渔业资源管理法》 1994
- 《海事力量法》 2013
- 《渔业管理条例》 1992
- 《渔业管理条例》（修正案） 1997
- 《澳大利亚渔业（侵权罪）条例》 2001

政策和准则

- 《英联邦渔业捕捞策略：政策和准则》 2007
- 《英联邦渔业捕捞策略政策：采用基于证据的方法制定英联邦渔业捕捞水平的框架》 2018
- 《关于执行英联邦渔业捕捞策略政策的准则》（2018）
- 《南部鱿鱼渔业（总可捕捞努力量）的决议》 2018

新西兰

法律和条例

- 渔业法案 1996
- 渔业（报告）条例 2017
- 渔业（报告）修订条例 2018
- 渔业（商业捕捞）条例 2001
- 渔业（商业捕捞）修订条例 2018
- 渔业（地理空间定位报告）条例 2017
- 渔业（地理空间定位报告）修订条例 2018
- 渔业（船舶电子监测）条例 2017
- 渔业（船舶电子监测）修订条例 2019
- 渔业（侵权犯罪）条例 2001
- 渔业（侵权犯罪）修订条例 2018
- 渔业（保存记录）条例 1990
- 渔业（授权许可的渔获收购商）条例 1997

政策和准则

新西兰捕捞策略标准的实施准则

欧盟

- 欧洲议会和欧盟理事会条例（EC） 2013 年 12 月 11 日第 1380/ 2013 号共同渔业政策 [“共同渔业政策”]
- 理事会条例（EC） 第1224/2009号关于建立共同体控制制度以确保遵守共同渔业政策 [“控制条例”]
- 理事会条例（EC） 2008 年 9 月 29 日第1005/2008号关于建立共同体制度以预防、阻止和消除非法、不报告和不管理捕捞 “IUU 条例”] 的决定
- 理事会条例（EU） 2018 年 1 月 23 日第2018/120号关于确定 2018 年某些鱼类种群和种群组合的捕捞机会
- 理事会条例（EC） 2007 年 6 月 11 日第 676/2007 号
- 委员会执行条例（EU） 第2017/218号关于欧盟船队注册

美国

法律和规定

- 《马格努森 - 史蒂文斯渔业养护和管理法》（1976）（16 U.S.C. § § 1801-1891d）
- 15 C.F.R. PART. 904
- 50 C.F.R. PART 600 – 马格努森·史蒂文斯法案条款
- 50 C.F.R. PART 622 – 加勒比、墨西哥湾和南大西洋渔业
- 50 C.F.R. PART 635 – 大西洋高度洄游鱼种
- 50 C.F.R. PART 648 – 美国东北部渔业
- 50 C.F.R. PART 660 – 西海岸州的渔业
- 50 C.F.R. PART 665 – 西太平洋渔业
- 50 C.F.R. PART 679 – 阿拉斯加专属经济区渔业
- 50 C.F.R. PART 680 – 阿拉斯加专属经济区贝类渔业
- 50 C.F.R. PART 697 - 大西洋沿岸渔业合作管理

案例：

- 北卡罗来纳州渔业公司诉古铁雷斯案，518 F. Supp. 2d 62.85（美国哥伦比亚特区联邦地区法院 2007）
- 美国近海捕鱼协会诉戴利案，995 F. Supp. 1411, 1432（美国佛罗里达中区联邦地区法院，1998年）（援引缅因州联合渔业公司诉戴利案，954 F. Supp. 383, 389.(美国缅因联邦地区法院，1997))

政策和准则

NOAA 总法律事务办公室，民事行政处罚与许可处罚评估政策（2014）

附件 2 几个国家渔业管理制度的比较分析

国家 / 区域	可持续性标准	基于科学的管理	控制捕捞死亡率的机制	许可证、执照和船舶登记	监测机制	确保遵守的措施（执法）
《联合国海洋法公约》	最大可持续产量	“沿海国参照其现有的最佳科学证据，应通过正当的养护和管理措施，确保专属经济区内生物资源的维持不受过度开发的危害...”	在联合国一级没有； 由成员国制定	在联合国一级没有	在联合国一级没有； 由成员国制定	在联合国一级没有； 由成员国制定
澳大利亚	最大经济产量	澳大利亚渔业管理的“所有关键决定”必须以“现有最佳科学”为基础	产出控制 • TAC; ITQs; • 最小尺寸 • 持有上限 投入控制 • 总允许努力量 - 包括渔船数量、渔具类型和数量等 • 渔业关闭 • 有限准入	发给个别渔民的捕鱼许可证 发给渔获鱼类加工商、经销或零售鱼市场的收购许可证	• 纸质和电子捕捞日志 • 电子监测 • 渔获处理记录 • 海上观察员 • 船舶监测系统	• 口头警告 • 英联邦渔业侵权通知（罚款） • 许可制裁：修订、暂停或撤销捕捞特许权 • 渔业管理人员也可指示渔船：(1) 停止渔业活动；(2) 被带到某一特定地点；和/或 (3) 停止开船，接受“海上”登船检查 • 刑事诉讼
新西兰	最大可持续产量	渔业管理的所有决定，即与渔业资源的利用和可持续性有关的决定，必须以“现有最佳信息”为基础。	产出控制 • QMS (TAC; TACC; ITQ) • 最小尺寸 / 年龄限制 投入控制 • 渔具渔法限制 • 最小网目尺寸 • 渔业关闭 • 禁止丢弃	捕捞许可证 渔获收购许可证 商业渔船登记	• 电子监测 • 纸质和电子捕捞日志（渔民提交“事件报告”） • 地理空间位置报告 • 渔获收购商申报 • 海上观察员 • 码头监测	• 没收非法渔获、收益、渔具或用于犯罪的资产设备，及/或与违法有关的配额 • 侵权通知以及缴纳侵权费用 • 刑事起诉 • 未缴费导致暂停捕捞或收购许可

国家 / 区域	可持续性标准	基于科学的管理	控制捕捞死亡率 的机制	许可证、执照 和船舶登记	监测机制	确保遵守的措施（执法）
欧盟	最大可持续产量	制定管理措施，包括设定可捕量，必须以现有的最佳科学证据为基础	产出控制 • TAC/国家配额（如捕捞机会） • 最小上岸尺寸 投入控制 • 最大捕捞努力量（如船可在海上停留的时间限制） • 最小网目尺寸 • 禁渔区 • 禁渔期 • 网具设计和使用规范	发给渔船的捕捞许可证	• 船舶监测系统 • 船只探测系统 • 自动识别系统 • 捕捞日志 + 上岸申报 / 电子捕捞日志 • 海上船载观察员 • 上岸义务 • 定点上岸和港口检查	对“严重侵权”的制裁由成员国规定，但须遵守某些欧盟范围内的标准；可包括罚款，辅有以下措施： • 警告 • 扣押渔船 • 暂时固定渔船 • 没收违禁渔具、渔获物或渔业产品 • 暂停或撤销渔业授权或许可 • 捕捞权的减少或撤销 针对“严重侵权”的记分制度（每项严重的侵权行为都会导致预先设定的罚款点数从该船的许可证积分上扣除。一旦积分低于一定水平，许可证将被吊销） 刑事制裁（成员国）
美国	最优产量	渔业养护和管理措施以“现有最佳科学信息”为基础 年度捕捞限额“不得超过其相应的[管理委员会]科学和统计委员会或同行审查做出的捕捞量建议”	产出控制 • TAC; IFQ • 最小尺寸限制 • 持有量限制 • 禁止兼捕 投入控制 • “限制准入特权” • 渔具限制 • 禁渔区 • 禁渔期	• 商业渔船许可 • 联邦渔业许可 • 特定鱼种捕捞许可 • 渔获收购者许可	• 渔民和渔获收购商的日志（“航次票”） • 船舶监测系统 • 基于摄像头的电子监测 • 海上观察员 • 码头监测	对违反《马格努森-史蒂文斯法》• 行为的制裁 • 现场罚金 • 民事罚款 • 没收 • 刑事起诉 • 许可证制裁

English Edition

EXECUTIVE SUMMARY

Healthy fisheries provide valuable benefits to fishing nations. Productive and diverse fish populations provide food, create jobs, generate revenue, and contribute to a fishing nation's culture, identity and ecological health. A robust regulatory regime helps sustain fish populations to maximize these benefits. Indeed, an effective regulatory regime can help end overfishing, restore depleted fish stocks, and revitalize a prosperous fishing industry. Most fundamentally, such a regime generally includes practices to identify, implement, and enforce a sustainable level of fishing.

This white paper compares the standards, regulations, and enforcement mechanisms intended to promote fisheries' health that are set out in the UN Convention on the Law of the Sea and those adopted by Australia, New Zealand, the European Union, and the United States. Examining these regulatory regimes, which have evolved over time, offers insights into the different ways a fishing nation may achieve sustainability and thereby end overfishing, restore depleted fisheries, and rebuild affected sectors of its fishing industry. For each of these regimes, we compare sustainability standards, the role of science, the fishing mortality control measures employed, the system of licensing and permitting, monitoring mechanisms, and tools of enforcement.

Sustainability Standards

The regulatory regimes examined in this white paper are generally based on one of three closely related standards: maximum sustainable yield, maximum economic yield, and optimum yield. Although all three standards are intended to promote the sustainability of fisheries, they incorporate different costs and benefits into their analyses. The maximum sustainable yield, the benchmark adopted by the United Nations, aims to achieve the largest average catch that can be taken over time. It measures success by fish stock. The maximum economic yield, in contrast, measures success based on economic return (by considering both revenues and costs of fishing), focusing on achieving the greatest average commercial return for its fishing industry. In most cases, stock size is larger when managing by maximum economic yield rather than maximum sustainable yield. The optimum yield, as defined by United States law, is maximum sustainable yield, reduced by relevant social, economic, or ecological factors.

Science-Based Management

A common characteristic of the regulatory regimes discussed in this white paper is the requirement—either through a statute or regulation—that conservation measures incorporate the best available scientific information. These regimes recognize that data gathered—and estimations made—by scientists concerning such matters as the size of a fish stock, fecundity

rates, mortality rates, catch rates, bycatch estimates, and the environmental impacts of fishing are necessary for policymakers to make timely and informed decisions to achieve sustainability of the resource.

Fishing Mortality Control Mechanisms

The conservation measures that are adopted to control fishing mortality—and thus achieve the sustainability standard—generally take two main forms: output controls and input controls. Output controls focus on what can be removed from the ocean usually by setting catch limits for fish stocks. Input controls limit fishing mortality by restricting the resources utilized in fishing, such as the number of fishing vessels and types of equipment, that may be used by fishers. The regulatory regimes discussed in this white paper generally employ both output and input controls.

Permits, Licenses and Vessel Registration

Each of the regulatory regimes discussed in this white paper employs a system of licenses, permits, or vessel registration to identify and limit the number of fishing vessels that may engage in commercial fishing. Such systems include permit or license systems for fishers, which authorize and may restrict fishers' participation in a fishery, and receiver permit or license systems, which regulate the parties who may purchase the catch. Permits or licenses may limit both the type and amount of species that can be harvested.

Monitoring Mechanisms

The regulatory regimes examined in this report all include catch, vessel, and other types of monitoring mechanisms to monitor fishing operators' compliance with the relevant fishery rules and to collect data necessary to assess the fishery resources. These monitoring mechanisms may range from hardcopy logbooks that tally catch amounts to advanced satellite technologies that track the location of fishing vessels. Each of the regimes also requires its commercial fishing vessels to subject themselves to some degree of observation by government-authorized at-sea observers. All the fishing management regimes discussed in this white paper employ multiple methods to monitor vessel behavior and fishery catch.

Enforcement Measures

No regulatory regime can be effective without enforcement measures to penalize those who commit violations. The regulatory regimes examined in this white paper all have a variety of enforcement mechanisms available to them to promote compliance, deter offenses, and punish offenders. These include sanctions, such as the suspension or revocation of permits; civil fines and forfeitures; and, for the most egregious violations, criminal prosecution.



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FISHERY SUSTAINABILITY STANDARDS

The sustainability standard represents the goal of the regulatory regime—the level of output a fishing nation intends to achieve from its fisheries, most often expressed on an annualized basis for each fishery. The regimes examined in this white paper have adopted one of three standards: maximum sustainable yield (“MSY”), maximum economic yield (“MEY”), or optimum yield (“OY”).

UNCLOS



The United Nations Convention on the Law of the Sea (“UNCLOS”), often referred to as the Constitution for the Seas, is an international treaty that provides an overarching legal framework for marine and maritime activities. Among other things, UNCLOS sets forth a comprehensive set of international rules to address fishery activities both within countries’ respective exclusive economic zones and in international waters. These rules are largely framed in terms of nations’ rights and responsibilities and their duty to cooperate over straddling fish stocks and highly migratory species.¹ As of today, 168 U.N. parties have ratified UNCLOS, including Australia, New Zealand, China, and the European Union. The United States and 13 other countries are signatories to the treaty but have not yet ratified it.

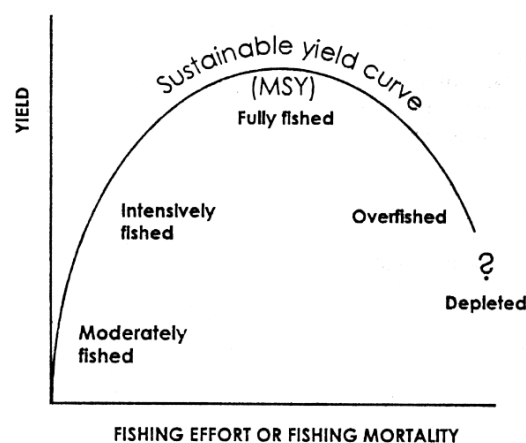
UNCLOS adopts “maximum sustainable yield,” or MSY, as the international sustainability standard.² According to UNCLOS, fishery management and conservation measures for fisheries should be “designed . . . to maintain or restore populations of harvested species at levels which

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1. Martin Tasamenyi & Quentin Hanich, Fisheries Jurisdiction Under the Law of The Sea Convention, in *The 1982 Law of the Sea Convention at 30: Successes, Challenges and New Agendas* 108, 110 (David Freestone ed. 2013).
 2. See United Nations Convention on the Law of the Sea, Dec. 10, 1982, 1833 U.N.T.S. 397, http://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf (last visited Feb. 4, 2019), art. 61, 119 [hereinafter UNCLOS].

can produce the maximum sustainable yield, as qualified by relevant environmental and economic factors, including the special requirements of developing States, and taking into account fishing patterns, the interdependence of stocks and any generally recommended international minimum standards, whether subregional, regional or global.”³

Although UNCLOS itself does not provide a definition of MSY, MSY is generally understood to mean “the largest long-term average catch or yield that can be taken from a [fish] stock or stock complex under prevailing ecological and environmental conditions.”⁴ To prevent overfishing and maintain a viable and thriving fishing industry, fish stocks that have achieved MSY produce the maximum yield of fish over an indefinite timeframe.⁵

MSY is usually measured in metric tons. For example, a fishery’s maximum sustainable yield is 1 million metric tons per year if taking more than 1 million metric tons of fish from the stock per year over several years is likely to deplete the stock such that the fishing nation will be prevented from taking 1 million metric tons in subsequent years. In the same example, taking less than 1 million metric tons per year will result in the fishing nation removing fewer fish than it could. The following diagram illustrates the MSY concept:



©S.M. Garcia, Fishery Resources Division, FAO Fisheries Department⁶

The fishery management provisions in UNCLOS were supplemented by the United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling

3. Id. art. 61 ¶ 3.

4. See Trade & Agric. Directorate Fisheries Comm., Org. for Econ. Coop. & Dev., OECD Review of Fisheries 2017: General Survey of Fisheries Policies 5 (Jan. 23, 2018), [http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=TAD/FI\(2017\)14/FINAL&docLanguage=En](http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=TAD/FI(2017)14/FINAL&docLanguage=En) (last visited Feb. 4, 2019).

5. See S.M. Garcia, Fishery Res. Div., Fisheries Dept, Food and Agric. Org. of the U.N., The Precautionary Approach to Fisheries and Its Implications for Fishery Research, Technology and Management: An Updated Review, in Precautionary Approach to Fisheries - Part 2: Scientific Papers (June 1995), <http://www.fao.org/3/W1238E02.htm> (last visited Feb. 4, 2019).

6. Id.

Fish Stocks and Highly Migratory Fish Stocks (the “U.N. Fish Stocks Agreement”), which was adopted in 1995 and came into force in 2001.⁷ In addition to reaffirming MSY as the sustainability standard, the U.N. Fish Stocks Agreement makes clear that MSY should serve as a reference point for all fisheries. For healthy fish stocks that are not overfished, the U.N. Fish Stocks Agreement provides that fishery management strategies shall ensure that fishing mortality does not exceed that which corresponds to maximum sustainable yield. For overfished stocks, the biomass that would produce maximum sustainable yield should serve as a rebuilding target.⁸

Australia

Australia has adopted “maximum economic yield,” or MEY, as its sustainability standard rather than MSY.⁹ MEY is the value of the largest positive difference between total revenues and total costs of fishing, including the cost of labor and capital. Thus, unlike MSY, which measures sustainability according to the yield of metric tons of fish, MEY measures sustainability according to the long-term profitability of the commercial fishing industry.¹⁰ Under the MEY standard, “[h]arvest strategies for key commercial species taken in Australia’s Commonwealth fisheries [should] be designed to pursue maximizing the economic yield from the fishery.”¹¹ Advocates of the MEY standard argue that it leads to fewer catches and higher natural and economic resilience of the fishery than the MSY standard. This is due to its incorporation of economic cost in the formula.¹² For example, whereas the MSY might call for 1 million metric tons of catch per year, the MEY might dictate a catch of only 750,000 metric tons per year if extracting the additional 250,000 metric tons of fish will result in lower profitability. This could occur, for example, if the cost and effort required to extract the additional fish is greater than the associated revenue or if the additional supply of fish causes the market price for the fish to decrease and reduce the

7. U.N. Agreement for the Implementation of Provisions of the U.N. Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, Aug. 4, 1995, 2167 U.N.T.S. 88., <https://documents-dds-ny.un.org/doc/UNDOC/GEN/N95/274/67/PDF/N9527467.pdf?OpenElement> (last visited Feb. 4, 2019) [hereinafter the UN Fish Stocks Agreement].

8. Id. Annex II ¶ 7.

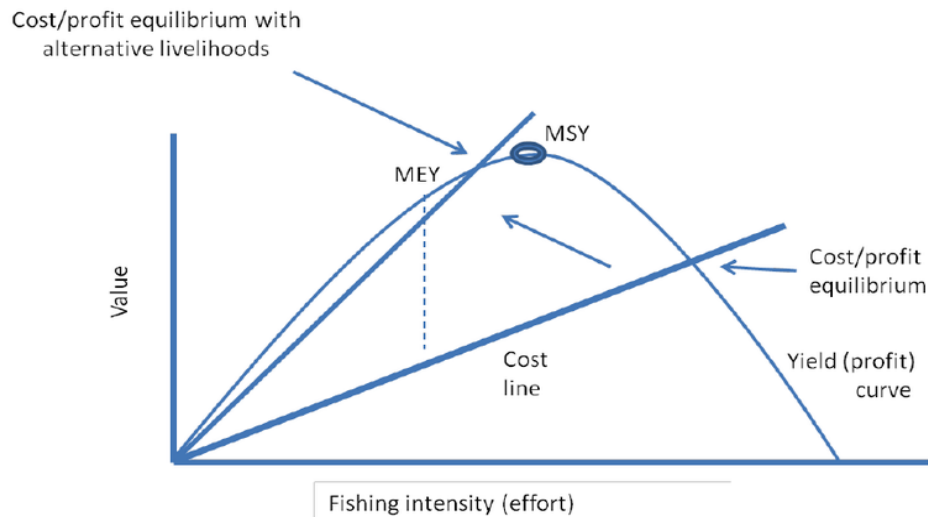
9. Austl. Dep’t of Agric. & Water Resources, Commonwealth Fisheries Harvest Strategy Policy: Framework for Applying an Evidence-based Approach to Setting Harvest Levels in Commonwealth Fisheries 6 (2d ed. 2018), available at <http://www.agriculture.gov.au/SiteCollectionDocuments/fisheries/domestic/hsp.pdf> (last visited Feb. 4, 2019) [hereinafter 2018 Framework for Applying an Evidence-Based Approach to Setting Harvest Levels]; Austl. Dep’t of Agric. & Water Resources, Guidelines for the Implementation of the Commonwealth Fisheries Harvest Strategy Policy 19 (2d ed. 2018), available at <http://www.agriculture.gov.au/SiteCollectionDocuments/fisheries/domestic/harvest-strategy-policy-guidelines.pdf> (last visited Feb. 4, 2019).

10. See Guidelines for the Implementation of the Commonwealth Fisheries Harvest Strategy Policy, *supra* note 9, at 19.

11. Austl. Dep’t of Agric. & Water Resources, Commonwealth Fisheries Harvest Strategy Policy and Guidelines 4 (Sept. 2007), available at <https://www.ccsbt.org/en/system/files/resource/en/4d901b50bfe92/05.pdf> (last visited Feb. 4, 2019) [hereinafter 2007 Commonwealth Fisheries Policy].

12. See, e.g., Guidelines for the Implementation of the Commonwealth Fisheries Harvest Strategy Policy, *supra* note 9, at 19 (“Some commercial fish stocks around the world are managed to a biomass target that achieves maximum sustainable yield (BMSY). This target maximises the long-term catch that can be taken in a fishery, but ignores the increasing costs of fishing as stocks are fished down to BMSY levels. MEY is generally achieved at a lower catch level (and conversely a higher biomass, BMEY) and aims to maximise the economic returns from fishing rather than maximise the quantity of fish landed.”)

overall profitability of the species. For this reason, some advocates of MEY argue that it is a more economically-rational and environmentally-friendly standard than MSY.¹³ A graph demonstrating the difference between MSY and MEY is set forth below:



© Douglas Fenner, Challenges for Managing Fisheries on Diverse Coral Reefs, 4 Diversity 105, 117 (2012).

New Zealand

New Zealand has adopted MSY as its sustainability standard. MSY is defined in New Zealand as “the greatest yield that can be achieved over time while maintaining the stock’s productive capacity, having regard to the population dynamics of the stock and any environmental factors that influence the stock.”¹⁴ New Zealand’s conservation measures are thus designed to permit fishing at a rate that maintains the stock at or above a level that can achieve MSY or, if the stock is below MSY, at a rate that restores the stock to a level that can produce the maximum sustainable yield indefinitely.¹⁵

EU

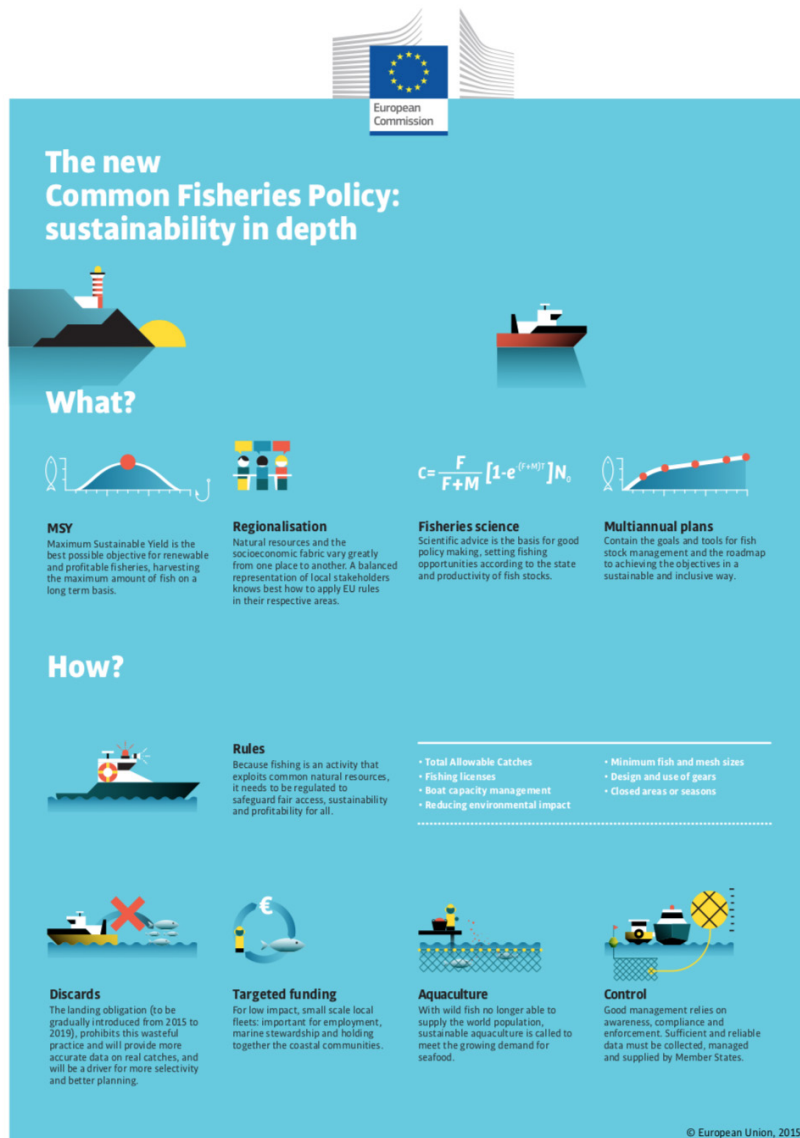
The EU has also adopted MSY as its sustainability standard. The EU defines MSY as “the highest theoretical equilibrium yield that can be continuously taken on average from a stock under existing average environmental conditions without significantly affecting the reproduction

13. See, e.g., Douglas Fenner, Challenges for Managing Fisheries on Diverse Coral Reefs, 4 Diversity 105, 116-17 (2012), available at https://www.researchgate.net/publication/272648936_Challenges_for_Managing_Fisheries_on_Diverse_Coral_Reefs (last visited Feb. 4, 2019).

14. New Zealand Fisheries Act 1996, art. 2.

15. Id. art. 13.

process.¹⁶ As one of its principal objectives, the EU's Common Fishery Policy, the highest-level legal framework setting forth the fishery management and conservation rules for member nations, lists ending overfishing by 2020 so that stock biomass – the total weight of a fish population – can be restored and maintained above levels that can produce MSY for all fish stocks.¹⁷ The EU has promoted its regulatory regime through the following summary:



© https://ec.europa.eu/fisheries/sites/fisheries/files/docs/body/2015-cfp-management_en.pdf

16. Regulation (EC) No 1380/2013 of the European Parliament and of the Council of 11 December 2013 on the Common Fisheries Policy, art. 4, ¶ 1(7), available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32013R1380> (last visited Feb. 4, 2019) [hereinafter CFP 2013]. See also Euro. Comm., Communication from the Commission to the Council and The European Parliament – Implementing Sustainability in EU Fisheries through Maximum Sustainable Yield (2006), available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52006DC0360> (last visited Feb. 4, 2019).

17. CFP 2013, supra note 16, art. 2 ¶ 2.

United States

The United States has adopted “optimum yield,” or OY, as its sustainability standard. OY is defined generally as “the maximum sustainable yield from the fishery, as reduced by any relevant social, economic, or ecological factor.”¹⁸ Social factors include the “enjoyment gained from recreational fishing,” the “preservation of a way of life for fishermen and their families,” and the “dependence of local communities on a fishery.”¹⁹ Economic factors include “encouraging domestic and export markets for U.S. harvested fish,” “the decrease in cost per unit of catch afforded by an increase in stock size,” and “alternate employment opportunities.”²⁰ Ecological factors include the impact of fishing on endangered species, forage fish stocks, and marine mammals.²¹

For fisheries that are overfished, OY calls for the restoration of the fishery “to a level consistent with producing the maximum sustainable yield in such fishery.”²²

Under the OY standard, uncertainty is resolved in favor of a lower yield. If a fishery has confidence in its estimates of fish stock and its management controls can accurately limit catch, optimum yield may be set “very close to MSY.” In contrast, if estimates and management controls are uncertain, optimum yield “should be set farther from MSY.”²³

Thus, while MSY is expressly incorporated into the regulatory regime of the United States, the overall OY standard means that yield may not exceed MSY and is likely to lead to effort and catches that are lower than MSY. For this reason, the United States’ OY standard, like MEY, is generally considered more environmentally conservative than MSY.²⁴

18. 16 U.S.C. § 1802(33) (emphasis added).

19. 50 C.F.R. § 600.310(e)(3)(iii)(B).

20. *Id.*

21. *Id.*

22. 16 U.S.C. § 1802(33).

23. 50 C.F.R. § 600.310(e)(3)(iv).

24. See Fenner, Challenges for Managing Fisheries on Diverse Coral Reefs, *supra* note 13, at 117.

SCIENCE-BASED MANAGEMENT

The regulatory regimes examined in this white paper generally rely heavily on science to inform management decisions. Each of the regimes requires the incorporation of the best available scientific evidence into its management of fisheries. They recognize that empirical data and the most up-to-date scientific knowledge and methodologies relating to matters such as the biomass of a fish stock, reproductive rates, mortality rates, the average age and size of a species, and the environmental impact of fishing practices are critical to implementing and enforcing sustainable fishery practices.

UNCLOS

UNCLOS requires its member nations to design their fishery conservation measures on the basis of the best scientific evidence available. Specifically, Article 61 of UNCLOS provides that “[t]he coastal State, taking into account the best scientific evidence available to it, shall ensure through proper conservation and management measures that the maintenance of the living resources in the exclusive economic zone is not endangered by over-exploitation. . . .”²⁵ Although UNCLOS does not define “best scientific evidence available,” the standard has been interpreted to favor conservation and require convincing scientific evidence that projected harvesting will achieve maximum sustainable yield before additional harvesting may occur.²⁶

Australia

In Australia, “[a]ll key decisions” concerning the country’s fishery regulations must be based on the “best available science.”²⁷ According to the Australian Fisheries Management Authority (“AFMA”), the agency responsible for managing the country’s fisheries and promulgating conservation measures, this policy requires policymakers to consider the “latest” scientific research when making decisions concerning Australia’s fisheries.²⁸ Some such research is produced by the

25. UNCLOS, *supra* note 2, art. 61. Article 119 of UNCLOS similarly provides that “[i]n determining the allowable catch and establishing other conservation measures for the living resources in the high seas, States shall . . . take measures which are designed, on the best scientific evidence available to the States concerned, to maintain or restore populations of harvested species at levels which can produce the maximum sustainable yield” *Id.* art. 119.

26. E. Latifah & M. N. Imanullah, *The Precautionary Principle in Fisheries Management Under Climate Change: How the International Legal Framework Formulate It?*, 129 IOP Conf. Series: Earth & Env’tl. Sci. (2018), doi :10.1088/1755-1315/129/1/012038, available at <https://iopscience.iop.org/article/10.1088/1755-1315/129/1/012038/pdf>.

27. 2007 Commonwealth Fisheries Policy, *supra* note 11, at 7.

28. FRDC Releases New Science (Oct. 21, 2016), AFMA, <https://www.afma.gov.au/frdc-releases-new-science> (last visited Feb. 4, 2019).

Fisheries Research and Development Corporation, which is a co-funded partnership between the Australian government and the fishing and aquaculture industries.²⁹ For AFMA fisheries, scientific advice is primarily provided by the Commonwealth Scientific and Industrial Research Organization, with important contributions from state fishery scientists and scientific consultants. Each major AFMA fishery has a Resource Assessment Group (“RAG”), which considers the scientific evidence collected and assessments undertaken with respect to that fishery, and provides advice to AFMA on the status of fish stocks, species, fishery economics and the impact of fishing on the marine environment.³⁰ Ultimately, each RAG makes recommendations that are used to set the “total allowable catch,” also known as “TACs,” for each commercial species.³¹

New Zealand

New Zealand law requires that fishery management decisions—those relating to the utilization of fishery resources and sustainability—be based on “the best available information.”³² The “best available information” includes scientific cultural, social, and economic information provided such information is available to the policymaker without unreasonable cost, effort, or time.³³ The Minister of Primary Industries (formerly known as the Minister of Fisheries) is thus obligated to use the best available information, for example, to set TACs to achieve MSY. Where uncertainty exists due to a lack of information, the Minister is nonetheless charged with setting TACs that are “not inconsistent with the objective” of maintaining fish stocks “at or above” or moving the stock “towards or above” the MSY.³⁴

In New Zealand, scientific research is overseen by the Ministry of Primary Industries.³⁵ Research providers contracted by the Ministry report to “Fisheries Assessment Working Groups” (“FAWGs”), which are comprised of scientists from government, industry, and non-governmental organizations. The FAWGs meet throughout the year to evaluate the research and make recommendations on matters such as adjustments to TAC levels.³⁶

29. Id.

30. 2018 Framework for Applying an Evidence-Based Approach to Setting Harvest Levels, *supra* note 9, at 21. See also Paul Marchal et al., A Comparative Review of Fisheries Management Experiences in the European Union And in Other Countries Worldwide: Iceland, Australia, and New Zealand [Author’s final draft for publication] (Sept. 2016), 10-11, <https://archimer.ifremer.fr/doc/00312/42305/41699.pdf> (last visited Feb. 12, 2019).

31. Austl. Dep’t of Agric. & Water Resources, Fishery Status Reports 2018, 119, 144 (Sept. 2018), <http://www.agriculture.gov.au/SiteCollectionDocuments/abares/publications/fsr2018.pdf>.

32. New Zealand Fisheries Act 1996, art. 10 & 13-2A.

33. Id. art. 2.

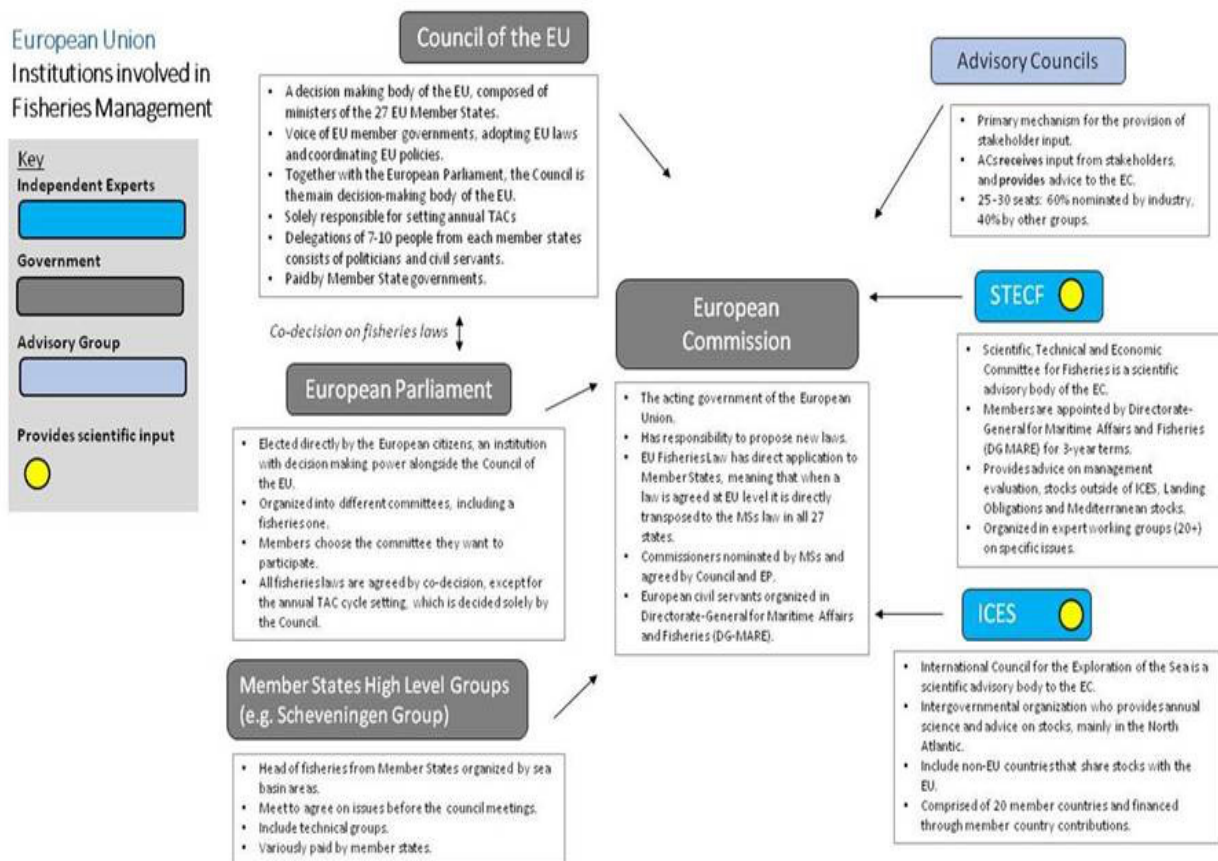
34. Id. art. 13-2A.

35. See Lynne Zeitlin Hale and Jeremy Rude (eds.), the Nature Conservancy, Learning from New Zealand’s 30 Years of Experience Managing Fisheries Under a Quota Management System (2017), at 22, 46, available at <https://www.nature.org/media/asia-pacific/new-zealand-fisheries-quota-management.pdf> (last visited Feb. 13, 2019) [hereinafter Learning from New Zealand].

36. See id. at 46-47.

EU

The EU requires that conservation measures adopted by its member nations be based on the best scientific evidence available. The EU's Common Fisheries Policy specifically provides that management measures be made "in accordance with the best available scientific advice."³⁷ The Common Fishery Policy also requires that allowable catches be set "on the basis of the best available scientific advice."³⁸ The EU receives its scientific advice from multiple bodies, including the Scientific Technical, and Economic Committee for Fisheries, which reports directly to the European Commission and is composed of experts in marine biology, ecology, fishery science, gear technology and other areas. The EU also relies on the International Council for the Exploration of the Sea, which conducts and coordinates research relating to the marine ecosystems of the North Atlantic; the Scientific Advisory Committee of the General Fisheries for the Mediterranean, which provides advice concerning the Mediterranean and the Black Sea; and the scientific committees of various regional organizations.



Credit: NRDC, Bowen Chang

37. CFP 2013, art. 3(c).

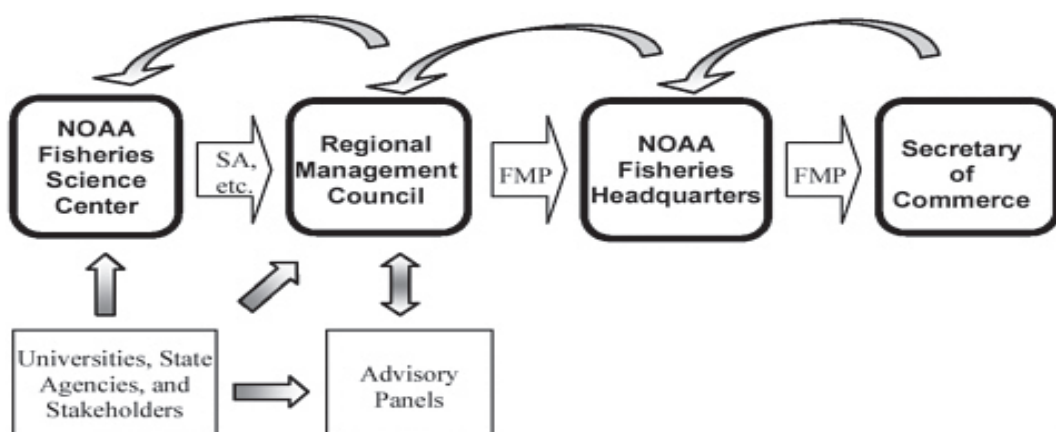
38. CFP 2013, art. 31(4). But see Fiona Harvey & Arthur Neslen, Fishing Quotas Defy Scientists' Advice, The Guardian (Dec. 16, 2014), available at <https://www.theguardian.com/environment/2014/dec/16/fishing-quotas-defy-scientists-advice> (noting that the European Commissioner for the Environment, Karmenu Vella, "admitted that many of the decisions on quotas were contrary to scientific advice.") (last visited Feb. 4, 2019).

United States



@<https://www.fisheries.noaa.gov/topic/laws-policies>

The United States similarly requires that fishery conservation and management measures be based on the “best scientific information available.”³⁹ The Magnuson-Stevens Fishery Conservation and Management Act (“Magnuson-Stevens Act”) establishes regional fishery management councils and mandates that annual catch limits “may not exceed the fishing level recommendations of [each council’s] scientific and statistical committee or the peer review process.”⁴⁰ While other nations and regions require their policymakers to consider the best available science when making decisions governing fisheries, the United States is unique in requiring that the scientifically recommended catch levels serve as the absolute maximum for annual catch limits. This has served to elevate the influence of science and has contributed to a decline in overfishing.



Flow of Scientific Information in the Fishery Management Plan (FMP) development process
(SA refers to a stock assessment).

39. 50 C.F.R. § 600.315 National Standard 2 – Scientific Information.

40. 16 U.S.C. § 1852(h)(6); see also 50 C.F.R. § 600.310(b)(2)(v).

According to the regulatory regime in the United States, “best scientific information available” means information of “a biological, ecological, economic, or social nature.”⁴¹ Courts have interpreted this standard to require that rules be based on “a thorough review” of available information at the time of a decision.⁴² NOAA Fisheries (also known as the National Marine Fisheries Service), the federal agency in charge of overseeing fisheries in the United States, may not “disregard superior data” in making policy.⁴³ However, NOAA Fisheries need not wait for “perfect or entirely consistent data” to act.⁴⁴ On the contrary, NOAA Fisheries may take more aggressive measures to advance conservation even in the presence of scientific uncertainty and a possibility of negative short-term effects on the fishing industry.⁴⁵

41. 50 C.F.R. § 600.315(b)(1).

42. *N. Carolina Fisheries Ass’n, Inc. v. Gutierrez*, 518 F. Supp. 2d 62, 85 (D.D.C. 2007).

43. *Id.*

44. *Id.*

45. *S. Offshore Fishing Ass’n v. Daley*, 995 F. Supp. 1411, 1432 (M.D. Fla. 1998) (citing *Associated Fisheries of Maine, Inc. v. Daley*, 954 F. Supp. 383, 389 (D. Me. 1997)).

TYPES OF FISHING MORTALITY CONTROL MECHANISMS

The conservation measures that fishing nations adopt in pursuit of their sustainability goals take two main forms: output controls and input controls.

Output controls directly limit the total numbers or total weight of fish catch allowed to be taken out of a fishery during a definite period. The most common form of output control is the previously mentioned “total allowable catch,” or “TAC,” which typically refers to the amount or number of one or more species that may be caught from a specific fishery in a given period. Other common forms of output controls include restrictions of the number of fish that may be landed by recreational fishers and bycatch limits.

While output controls target catch amounts directly, input controls do so indirectly by limiting the intensity, type, and amount of fishing effort that commercial fishers may employ. Common input controls limit the number of fishers through a permit or licensing system, restrict the size and capacity of fishing vessels, dictate the length and mesh size of nets, restrict the areas and times designated for fishing activities, and regulate the use of gear.

All the regimes discussed in this white paper employ a combination of both output and input controls. Most of the regimes require TACs. The exact combination of control measures is typically fishery-specific.

UNCLOS

Article 61 of UNCLOS provides that “a coastal State shall determine the allowable catch of the living resources in its exclusive economic zone.”⁴⁶ UNCLOS does not dictate what specific measures must be adopted by member states to achieve this “allowable catch,” but Article 62 indicates that a coastal state may implement “conservation measures” to regulate the fishing activity in its exclusive economic zone, and that such conservation measures may include both output and input controls. For instance, Article 62(4) provides that a coastal member state may, among other things, require “licensing of fishermen, fishing vessels and equipment,” “fix[] quotas of catch,” “regulat[e] seasons and areas of fishing, the types, sizes and amount of gear, the types, sizes and number of fishing vessels that may be used,” and “fix[] the age and size of fish and other species that may be caught.”⁴⁷

46. UNCLOS, *supra* note 2, art. 61.

47. *Id.* art. 62.

Australia

Australia uses a combination of output and input controls to manage its fisheries. In Australia, “output controls” refer to “[m]anagement measures that place restrictions on the outputs from fishing, including how much is caught, what species are taken and the size of those species,” while “input controls” refer to “[m]anagement measures that place restraints on fishing, e.g.[.] who fishes (license limitations), where they fish (closed areas), when they fish (closed seasons) or how they fish (gear restrictions).”⁴⁸

One of the most important output control measures in Australia is the setting of TACs based on the number of fish of a particular species that can be taken from a fishery in a given period.⁴⁹ For some fisheries, the TAC is implemented in the form of individual transferable quotas (“ITQs”). An ITQ assigns portions of the seasonal TAC for a particular species or fish stock to an individual holder. ITQs are fully transferable and can be sold or leased to other persons.⁵⁰

Some fisheries in Australia also employ an input control called “total allowable effort,” which specifies the type and amount of gear that can be used in a fishery during the fishing season.⁵¹

By way of example, the Western Tuna and Billfish Fishery, the Small Pelagic Fishery and the Southern and Eastern Scalefish and Shark Fishery are all managed by limiting the catch of certain species, restricting the number of boats that may engage in commercial fishing, and regulating the types of gear the boats may carry.⁵² The Southern Squid Jig Fishery is managed by limiting effort, including restricting the number of boats allowed to fish in the area, and regulating what gear they may use, but there is no catch limit.⁵³ In other fisheries, management measures, such as limited entry⁵⁴ and closures,⁵⁵ are also used in combination with limits on catch or effort.

48. Guidelines for the Implementation of the Commonwealth Fisheries Harvest Strategy Policy, *supra* note 9, at 69–70.

49. See *id.* at 72.

50. See F. Meany, The Introduction of Individual Transferable Quotas into the Australian Section of the Southern Bluefin Tuna Fishery, FAO, <http://www.fao.org/docrep/pdf/004/y2684e/y2684e18.pdf>.

51. See, e.g., Southern Squid Jig Fishery (Total Allowable Effort) Determination 2018 (Nov. 7, 2018) (issued by AFMA and determining the total allowable effort for the 2019 fishing year in the Southern Squid Jig Fishery), available at <https://www.legislation.gov.au/Details/F2018L01558> (last visited Feb. 14, 2019).

52. See General Description of Fisheries Management in the Western Tuna and Billfish Fishery, AFMA, <https://www.afma.gov.au/fisheries/western-tuna-and-billfish-fishery> (last visited Feb. 4, 2019); General Description of Fisheries Management in the Small Pelagic Fishery, AFMA: <https://www.afma.gov.au/fisheries/small-pelagic-fishery> (last visited Feb. 4, 2019); General Description of Fisheries Management in the Southern and Eastern Scalefish and Shark Fishery, AFMA, <https://www.afma.gov.au/fisheries/southern-eastern-scalefish-shark-fishery> (last visited Feb. 4, 2019).

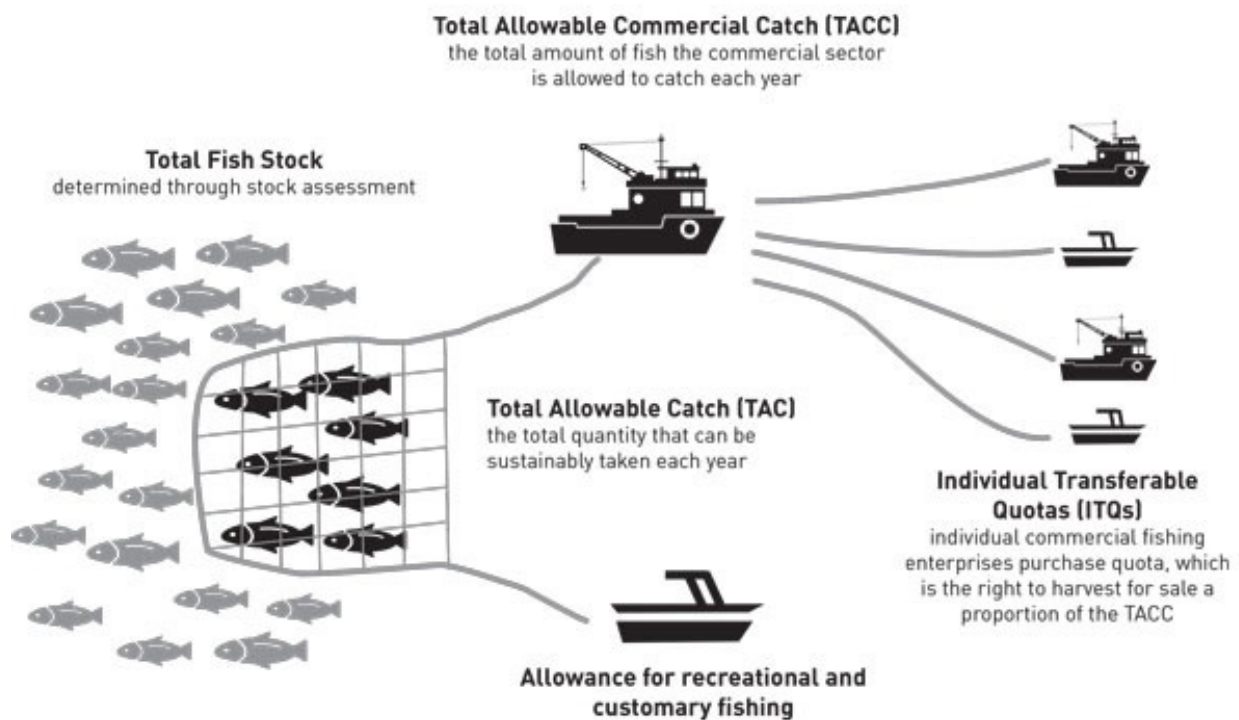
53. General Description of Fisheries Management in the Southern Squid Jig Fishery, AFMA, <https://www.afma.gov.au/fisheries/southern-squid-jig-fishery> (last visited Feb. 4).

54. Australia Fisheries Resource Management Act 1994, art. 58 (a “management plan” may “restrict the number of authorisations that can be granted or provide that no further authorizations can be granted”). Limited entry is a common input management tool, where only a fixed number of operators are allowed to fish in a particular fishery, and new operators may only gain access to the fishery by purchasing an existing right. Australia is among the countries/regions that pioneered the use of limited entry as an input control measure in the 1960s and 1970s. Corbett A. Grainger & Dominic P. Parker, The Political Economic of Fishery Reform, 5 *Annu. Rev. Resour. Econ.* 369, 373 (2013), available at <https://aee.wisc.edu/dparker5/papers/PoliticalReformARRE2013.pdf>.

55. See Australia Fisheries Management Act 1991, art. 41A.

New Zealand

New Zealand similarly uses a combination of input and output controls to manage its fisheries. A core feature of New Zealand's fisheries management system is its "Quota Management System," or QMS.⁵⁶ QMS is a rights-based management system that relies on TACs and ITQs. For each commercially harvested fishery, the Ministry of Primary Industries sets a TAC and a secondary number for total allowable commercial catch, or "TACC," for each year or fishing season.⁵⁷ The TACC is then apportioned to individual commercial fishers through ITQs, which are divisible and transferrable property rights. While an ITQ holder has a perpetual right to harvest a proportion of species or group of species within a defined fishing area, the actual amount the fisher is allowed to catch is reset at the beginning of each year or fishing season when the new TACC levels are set.⁵⁸ The diagram below illustrates the QMS system:



©<https://www.mpi.govt.nz/law-and-policy/legal-overviews/fisheries/quota-management-system/>

56. See Learning from New Zealand, *supra* note 35, at 11.

57. New Zealand Fisheries Act 1996, pt. 4. See also Quota Management System, Fisheries New Zealand, <https://www.fisheries.govt.nz/law-and-policy/legal-overviews/fisheries/quota-management-system/> (last visited Feb. 5, 2019).

58. See generally Learning from New Zealand, *supra* note 35, at 37.

In addition to the QMS, New Zealand fisheries employ other, more technical output and input controls. Some fisheries prohibit catches of certain species that are below certain sizes or ages.⁵⁹ Other fisheries restrict the use of damaging fishing gear and methods.⁶⁰ For instance, commercial fishers are prohibited from using nets with a mesh size smaller than necessary to catch the minimum length of finfish.⁶¹ Trawling is prohibited completely in certain closed seamount areas.⁶²

New Zealand also makes use of closures. In 2018, the New Zealand Ministry of Fisheries announced that the Southern Scallop Fishery would be temporarily closed for commercial and recreational fishing to protect the sustainability of the fishery.⁶³

Unlike Australia, which generally tolerates discarding, New Zealand's "discard ban" generally prohibits commercial fishers from discarding catches covered by the quota management system. Exceptions apply such that discarding may occur when (1) the fish is under the relevant minimum legal size, in which case the fish must be immediately returned to the sea whether alive or dead, or (2) the species has a high rate of survivability when returned to the sea, and the return takes place as soon as practicable after the species has been taken.⁶⁴

EU

The EU manages fisheries through TACs, quotas, effort regimes and technical measures.⁶⁵ TACs, also known in the EU as fishing opportunities,⁶⁶ are the maximum quantities of fish from specific stocks that can be caught in a given year. TACs are set annually for most commercial fish stocks⁶⁷ and each TAC is then allocated among EU member states in the form of national quotas. Unlike Australia or New Zealand, the EU does not allocate fishing rights to individual fishers. Rather, each member state may decide for itself how to allocate its fishing opportunities to fishers

59. See generally General Descriptions of New Zealand's Fisheries Management, Fisheries New Zealand, <https://www.fisheries.govt.nz/protection-and-response/sustainable-fisheries/strengthening-fisheries-management/managing-our-catches/#manage-com-fishing> (last visited Feb. 4, 2019).

60. See id.

61. New Zealand Fisheries (Commercial Fishing) Regulations 2001, art. 31.

62. Id. art. 73.

63. Temporary Closure of the Southern Scallop (SCA 7) Fishery, Fisheries New Zealand (July 6, 2018), <https://www.mpi.govt.nz/news-and-resources/consultations/temporary-closure-of-the-southern-scallop-sca-7-fishery-2/> (last visited Feb. 4, 2019).

64. New Zealand Fisheries Act 1996, sec. 72; schedule 6. See also Anastasia Telesetsky, Fishing for the Future: Addressing Fisheries Discards and Increasing Export Value for New Zealand's Sustainable Fisheries (Aug. 2016), 22-25, available at <http://fulbright.org.nz/wp-content/uploads/2016/08/Print-ready-Anastasia-Telesetsky-Axford-report.pdf> (last visited Feb. 12, 2019); Learning from New Zealand, *supra* note 35, at 50-51.

65. Council Regulation (EC) No 1224/2009 of 20 November 2009, whereas (10), available at <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:343:0001:0050:EN:PDF> ("Management of fishery resources at Community level is based in particular on total allowable catches (TACs), quotas, effort regimes and technical measures. Appropriate steps should be taken to ensure that Member States adopt the necessary measures to implement these management measures in an effective manner."). See, e.g., COUNCIL REGULATION (EU) 2018/120 of 23 January 2018 fixing for 2018 the fishing opportunities for certain fish stocks and groups of fish stocks, available at <https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX:32018R0120> (last visited Feb. 4, 2019).

66. See EU Control Regulation, whereas (22).

and vessels that fly its flag. Regardless of how a member state chooses to allocate its fishing opportunities, it is responsible for ensuring that it does not exceed the maximum levels set by the EU.⁶⁸

The EU also employs a wide range of input controls to limit the effort put into its fisheries. These restrictions are set forth in a broad set of rules that govern how, where, and when fishers may fish. Specifically, they include measures such as minimum mesh sizes for nets, closed areas and seasons, specifications for design and use of gear, and minimum landing sizes.⁶⁹ For some fish stocks, there is a maximum level of fishing effort available for fleets in a certain geographical area. Like total allowable catches, the maximum fishing effort is generally allocated to each member state, and a member state may determine for itself, consistent with EU legislation and regulations, how to allocate the fishing effort to vessels that fly its flag.⁷⁰

United States

Much like Australia and New Zealand, the United States manages its fisheries through a combination of output control tools—primarily TACs for each federally managed fishery as well as limits for bycatch and fish size—and input control tools, which include gear limitations, closed zones, seasonal closures, and bag and possession limits.⁷¹ “Annual catch limits” (i.e., annual TACs) must be set in each federally managed fishery (except for a few short-lived species that are exempt from this requirement), making it the primary mechanism for controlling fishing mortality in intensively-exploited fisheries.

The United States is divided into eight fishery management regions, each with a regional fishery management council that sets management policies for the fisheries in the region.⁷²

67. See, e.g., EC, Commission Proposes Fishing Opportunities in the Atlantic and North Sea for 2019 (Nov. 7, 2018), http://europa.eu/rapid/press-release_IP-18-6301_en.htm (last visited Feb. 12, 2019).

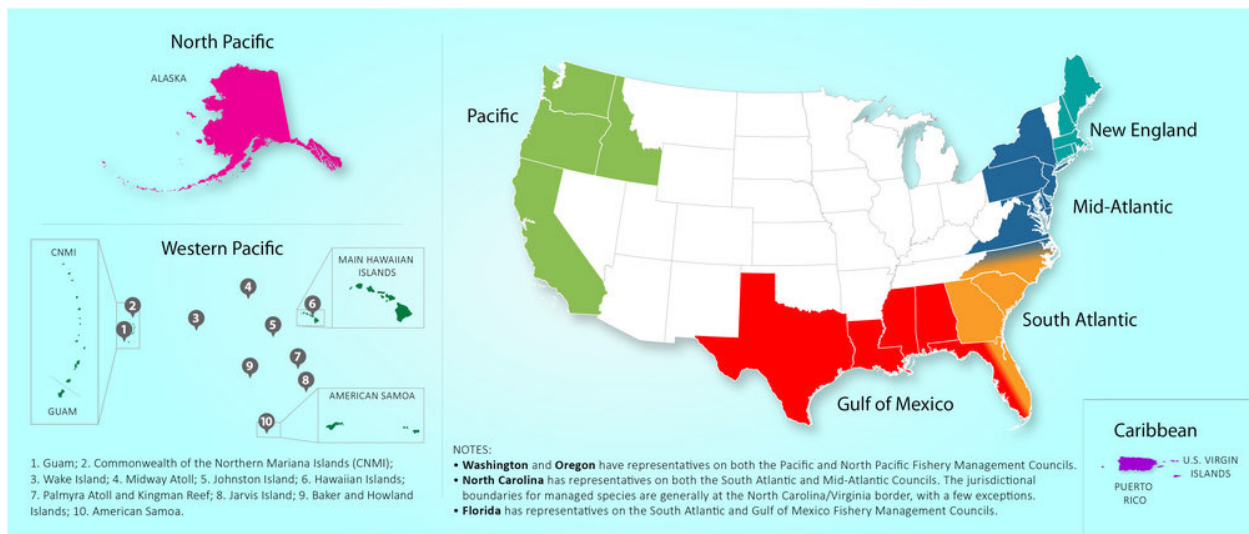
68. Introduction to Fishing Quotas in EU, EU Fisheries, https://ec.europa.eu/fisheries/cfp/fishing_rules/tacs_en (last visited Feb. 5, 2019).

69. Introduction to Technical Measures, EU Fisheries, https://ec.europa.eu/fisheries/cfp/fishing_rules/technical_measures_en (last visited Feb. 4, 2019).

70. See, e.g., Council Regulation (EC) No 676/2007 of 11 June 2007, available at <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2007R0676:20110101:EN:PDF> (last visited Feb. 4, 2019).

71. See, e.g., 50 C.F.R. § 622.38; The daily bag limit is defined as the maximum number or pounds of fish, shellfish, or seaweed of a given species and size that a person may legally keep in a single day. The related possession limit is the number of daily limits allowed to be kept in the field or in transit. See also What Is the Difference Between the Daily Catch Limit and the Possession Limit for Fish?, WDFW Help, <https://wdfw.wa.gov/help/questions/49/What+is+the+difference+between+the+daily+catch+limit+and+the+possession+limit+for+fish%3F> (last visited Feb. 4, 2019).

72. See 16 U.S.C. 1852.



@<http://www.fisherycouncils.org/>

For example, commercial fishing activity in Alaska, which comprises the North Pacific region, is subject to “general limitations” such as “harvest limits” and “maximum retainable amounts,” in addition to specific limitations that prohibit certain bycatch, impose closures, regulate seasons, and restrict fishing gear.⁷³

Like Australia and New Zealand, the United States has adopted individual fishing quotas in some fisheries as a mechanism for managing economic and social impacts of management measures. Known as “Limited Access Privileges,” individual fishing quotas are recorded in federal permits that authorize their holders to harvest specific quantities of fish and are generally transferable through sale or lease.⁷⁴ Other fisheries use “sectors,” by which catch is allocated to a group of fishers to self-manage, rather than to individuals.⁷⁵

73. 50 C.F.R. pt. 679.

74. 16 U.S.C. §§ 1802(26) & 1853a(7).

75. Allocation of Fishery Harvests under the Magnuson-Stevens Fishery Conservation and Management Act: Principles and Practice, NOAA Fisheries (Feb. 2012), <https://repository.library.noaa.gov/view/noaa/4117> (last visited Feb. 12, 2019).

PERMITS, LICENSES, AND VESSEL REGISTRATION⁷⁶

As suggested above, systems of permitting, licensing and registration are important input controls used in all of the regulatory regimes discussed in this white paper. Each of these regimes uses a licensing or registration system to regulate the vessels that may engage in commercial fishing. The regimes discussed also impose limits on the persons who may engage in different types of commercial fishing through a permit system. Finally, all the management regimes discussed in this white paper implement some form of fish receiver permit systems to regulate and limit who may purchase catch.

UNCLOS

UNCLOS does not require its members to adopt permitting or licensing systems or other specific input controls. UNCLOS does, however, contemplate the “licensing of fisherman, fishing vessels and equipment” by coastal states to manage their fisheries.

Australia

Australia relies on a permitting system to regulate its fisheries.⁷⁷ A permit may authorize its holder to use a boat to engage in commercial fishing, recreational fishing, or fish processing.⁷⁸ Fishing permits in Australia are typically subject to various conditions such as limitations on the stock and quantity of fish authorized to be taken, the rate at which fishing may be conducted, the area of operation, the fishing methods and gear used, and the term during which the permit may be used. Permits may be granted for a maximum term of five years, but most fisheries limit them to one year, at which point holders may apply for renewal.⁷⁹ Commercial fishers must obtain certificates of competency before working as skippers, mates, and engineers on a commercial fishing vessel.⁸⁰

76. There is no consistent conceptual distinction between the terms “license” and “permit” across different regulatory regimes. Each regulatory regime uses its own vernacular, and this white paper uses the terms adopted by the applicable regulatory regime.

77. Australia Fisheries Management Act 1991, sec. 32(1).

78. Id. sec. 32(4).

79. Introduction to Fishing Rights and Permits, AFMA, <https://www.afma.gov.au/fisheries-services/fishing-rights-permits> (last visited Feb. 4, 2019).

80. See Commercial Fisher, Austl. Maritime Safety Auth., <https://www.amsa.gov.au/audiences/commercial-fisher> (last visited Feb. 4, 2019).

Some fisheries set forth their own rules and policies in individual fishery management plans. A holder of a permit that authorizes fishing in a specific fishery must comply with any additional conditions set forth in the applicable plan of management.⁸¹ Fishing permits in Australia are generally transferrable from one person to another.⁸²

Because permits are issued to persons rather than vessels in Australia, a permit holder may change vessels at any time provided the vessel complies with applicable conditions.⁸³ There is no uniform registration requirement for fishing vessels fishing in Australian waters; however, all those who wish to fish the high seas must register their vessel with AFMA.⁸⁴

Australia also requires fish processors, wholesalers, and retailers to hold receiver permits if they wish to purchase and sell fish obtained from one of ten specified fisheries.⁸⁵ These fisheries include the Southern Bluefin Tuna Fishery, the Coral Sea Fishery, the Southern and Eastern Scalefish and Shark Fishery, and the Eastern Tuna and Billfish Fishery.⁸⁶ Fish receiver permits are generally required for fisheries where there is a need to more closely monitor the effectiveness of certain regulations. For example, AFMA introduced receiver permits to the Eastern Tuna and Billfish Fishery in order to monitor a ban on blue and black marlin and to determine the extent to which such fish were being landed.⁸⁷ Fish receiver permits are generally granted for 12 months.⁸⁸

New Zealand

New Zealand has adopted a fishing permit system that is substantially similar to Australia's. As in Australia, a fishing permit is required for a fisher to engage in commercial fishing activity in New Zealand's waters.⁸⁹ Such permits may be issued subject to a variety of conditions, including the allowable stocks, areas, and methods, the vessel that may be used, the types and amounts of fishing gear, the taking or handling of fish, the places of landing, and periods in which fishing can occur.⁹⁰ In addition, applicants for fishing permits may be required to provide a third-party guarantee, or bond, in a specified amount.⁹¹ The Ministry for Primary Industries keeps a permit registry that records certain information about each fishing permit.⁹² Unlike Australia, however, New

81. Australia Fisheries Management Act 1991, sec. 32(5)-(7).

82. Id. sec. 32A.

83. Id. sec. 32(1C).

84. Id. pt. 4(A).

85. Id. pt. 6, div. 2; Australia Fisheries Management Regulations 1992, pt. 4, div. 2.

86. Introduction to Fishing Rights and Permits, *supra* note 79.

87. Australia Fisheries Management Regulations (Amendment) 1997.

88. Introduction to Fishing Rights and Permits, *supra* note 79.

89. New Zealand Fisheries Act 1996, pt. 6. See also <https://www.fishserve.co.nz/information/permits>.

90. New Zealand Fisheries Act 1996, sec. 92.

91. Id. sec. 91(5).

92. Id. sec. 98, 100 & 297.

Zealand law prohibits a fishing permit holder from transferring the permit to another person.⁹³

For vessel registration, New Zealand goes further than Australia by requiring all vessels used for commercial fishing to be registered on the “fishing vessel register.”⁹⁴

Under New Zealand law, only licensed fish receivers are allowed to receive fish for sale. With limited exceptions, commercial fishers must sell their catch to an approved licensed fish receiver.⁹⁵

EU

The EU requires fishing vessels to obtain a fishing license in order to engage in commercial fishing activity in EU waters.⁹⁶ The EU delegates to its member states authority to issue and manage these licenses in accordance with EU legislation and regulations.⁹⁷ Pursuant to EU legislation, each vessel must fly the flag of a member state and register with the EU’s “fleet register.”⁹⁸ Each vessel is assigned a European Community Fleet Register number that allows the vessel to be easily identified and searched.⁹⁹

To obtain and hold a fishing license, a vessel must abide by minimum requirements concerning the “identification, technical characteristics and fitting out” of the fishing vessel.¹⁰⁰ The EU does not, however, attach to the licenses specific conditions relating to fish stocks, areas, or gear. Nor does the EU issue individual fishing permits or receiver permits. Those matters are left to member states to regulate.¹⁰¹

United States

The United States also uses permit and licensing systems to regulate fishing. However, unlike Australia or New Zealand, the United States does not have a nation-wide uniform licensing or permit system. Rather, NOAA Fisheries administers separate permit and licensing requirements for each of the country’s eight management regions.¹⁰² These requirements not only vary from region to region, but they also tend to be specific to each fishery and species. For example, in the Greater Atlantic, Caribbean, Gulf of Mexico, and South Atlantic regions, all commercial fishing

93. Id. sec. 89(10).

94. Id. sec. 103-113A.

95. New Zealand Fisheries (Licensed Fish Receivers) Regulations 1997, art. 3.

96. EU Control Regulation, whereas (13).

97. See id. art. 6(5).

98. Commission Implementing Regulation (EU) 2017/218 on the Union fishing fleet register.

99. Fleet Register on the NeT: <http://ec.europa.eu/fisheries/fleet/index.cfm> (last visited Feb. 4, 2019).

100. EU Control Regulation, art. 4(9).

101. See EU Control Regulation.

102. See Permits, NOAA Fisheries, <https://www.fisheries.noaa.gov/permits-and-forms#fishing-seafood> (last visited Feb. 4, 2019).

vessels must have a commercial vessel permit.¹⁰³ In the West Coast region, a permit authorizing the use of specific gear is required to fish for highly migratory species in California, Oregon and Washington.”¹⁰⁴

Depending on the fishery and the species, fishing vessels and operators in the U.S. are frequently required to possess multiple permits or licenses. For instance, a fishing vessel targeting groundfish in the exclusive economic zone off of Alaska, which comprises the North Pacific region, must have both a federal fishery permit and a special “groundfish license.”¹⁰⁵

The United States also requires certain dealers and receivers of fish to obtain permits and comply with certain reporting requirements.¹⁰⁶ Similarly, some regions require commercial fishing vessels to sell their catch only to federally permitted fish dealers.¹⁰⁷ For example, in the Atlantic Coastal Fisheries, dealers must hold a permit in order to purchase, possess, or receive American lobster for commercial purposes.¹⁰⁸ In the Greater Atlantic Region, fishers must sell their catch only to federally permitted dealers.¹⁰⁹ In practice, federally permitted commercial fishing vessels in every region typically sell their catch only to federally permitted fish dealers.

103. 50 C.F.R. § 622.4; see generally Fishing Permits, NOAA Fisheries Greater Atlantic, <https://www.greateratlantic.fisheries.noaa.gov/aps/permits/fishing/index.html> (last visited Feb. 14, 2019).

104. 50 C.F.R. § 660.707.

105. 50 C.F.R. § 679.4.

106. See, e.g., Federally Permitted Seafood Dealer Reporting Requirements (Oct. 1, 2014), NOAA Fisheries, <https://www.greateratlantic.fisheries.noaa.gov/aps/dealer/fedseafooddealerreportrequirements.pdf>; 50 C.F.R. §§ 648.7, 697.6 & 635.5.

107. See, e.g., 50 C.F.R. 648.14.

108. 50 C.F.R. § 697.6(a).

109. See generally Fishing Permits, *supra* note 103.

MONITORING MECHANISMS

Effective regulatory regimes use a variety of mechanisms to monitor their fisheries and to verify that participants—commercial and recreational fishers, processors, and wholesalers—are complying with regulations (e.g., time and area closures, catch limits, and gear restrictions). These mechanisms include satellite vessel monitoring systems, hardcopy and digital logbooks, at-sea observers, on-board electronic monitoring systems, and dockside monitoring of vessel contents and the offloading of catch.

UNCLOS

UNCLOS requires that member states adopt laws and regulations to ensure their vessels comply with applicable international fishery rules and standards.¹¹⁰ UNCLOS leaves the specific design and adoption of such monitoring mechanisms to member states.¹¹¹

Australia

AFMA is responsible for monitoring Australia's fisheries. To do so, AFMA uses a range of mechanisms, which can generally be divided into two categories: catch tracking and vessel tracking.



© <https://www.southcoastregister.com.au/story/1787772/fisheries-raid-vessels-at-greenwell-point/>

110. See UNCLOS, *supra* note 2, art. 217.

111. See *id.*

To keep track of catches, AFMA uses logbooks, electronic monitoring (“e-monitoring”), at-sea observers, and catch disposal records.¹¹² All fishing vessels operating in Australia are required to maintain and submit to AFMA logbooks that record information such as the time and location of their fishing operations, the type of gear used, the composition of catches and any interactions with threatened, endangered or protected species. Fishers who fish with certain gear and methods in certain fisheries may be required to use electronic logbooks (“e-logs”) in addition to or instead of hardcopy logbooks. For example, as of 2019, fishers who have fished 50 days or more in a fishing season with line or trawl methods in the Coral Sea Fishery and the Small Pelagic Fishery are required to use e-logs instead of paper logs.¹¹³

AFMA’s logbook requirements are further supplemented by e-monitoring, which is a system of on-board video cameras and sensors that monitor and record fishing activities and vessel locations. These e-monitoring systems allow AFMA to independently verify the reporting in logbooks. E-monitoring is now mandatory for most commercial fishing boats in fisheries in Australia.¹¹⁴ Fishing vessels that have installed e-monitoring systems are not required to carry on-board observers.¹¹⁵

For those fishing vessels that do not have e-monitoring systems, AFMA can require, with advance reasonable notice, the vessels to carry at-sea observers for a specified period. A fishing vessel nominated to receive an observer must ensure that the observer safely boards the vessel and must provide the observer with adequate food, accommodation, and medical facilities at no expense.¹¹⁶ The observers must also be given access to all parts of the vessel to the extent reasonably necessary to carry out their duties, and no operator or crew member of the vessel shall assault, obstruct, resist, delay, refuse boarding to, intimidate or interfere with an observer in the performance of his or her duties.¹¹⁷

In fisheries subject to catch quotas, fishers must complete disposal records upon landing that detail the species caught and their accurate weight.¹¹⁸ In certain fisheries, fishers may be required to record additional information, such as the number of boxes containing fish, the state

112. See Domestic Compliance, AFMA, <https://afma.govcms.gov.au/domestic-compliance> (last visited Feb. 14, 2019).

113. Fisheries Management Act 1991, art. 42 (“Determinations relating to logbooks and the furnishing of returns”); Logbooks for Fisheries Determination 2017, <https://www.legislation.gov.au/Details/F2017L00446>. See also Fisheries Services: Logbooks, AFMA, <http://www.afma.gov.au/fisheries-services/logbooks/>.

114. Electronic Monitoring Program, AFMA, <https://www.afma.gov.au/monitoring-enforcement/electronic-monitoring-program>. See also Catalyzing the Growth of Electronic Monitoring in Fisheries, Mark Michelin, Matthew Elliott Max Bucher, Cal. Environ. Assoc., Mark Zimring, Mike Sweeney, The Nature Conservancy, https://www.nature.org/content/dam/tnc/nature/en/documents/Catalyzing_Growth_of_Electronic_Monitoring_in_Fisheries_9-10-2018.pdf (last visited Feb. 5, 2019) (“Australia’s first [Electronic Monitoring (“EM”)] trials began in 2005 with a single boat fishing in the Southern Ocean. In 2015, EM was adopted for the gillnet hook and trap fishery and the tuna and billfish fisheries. The program now covers 75 vessels and is expected to expand to eventually cover most, if not all, of the Commonwealth fisheries in the next 5 to 10 years.”) (emphasis added).

115. Electronic Monitoring Program, *supra* note 114.

116. Observer Program, AFMA, <https://www.afma.gov.au/monitoring-enforcement/observer-program> (last visited Feb. 22, 2019).

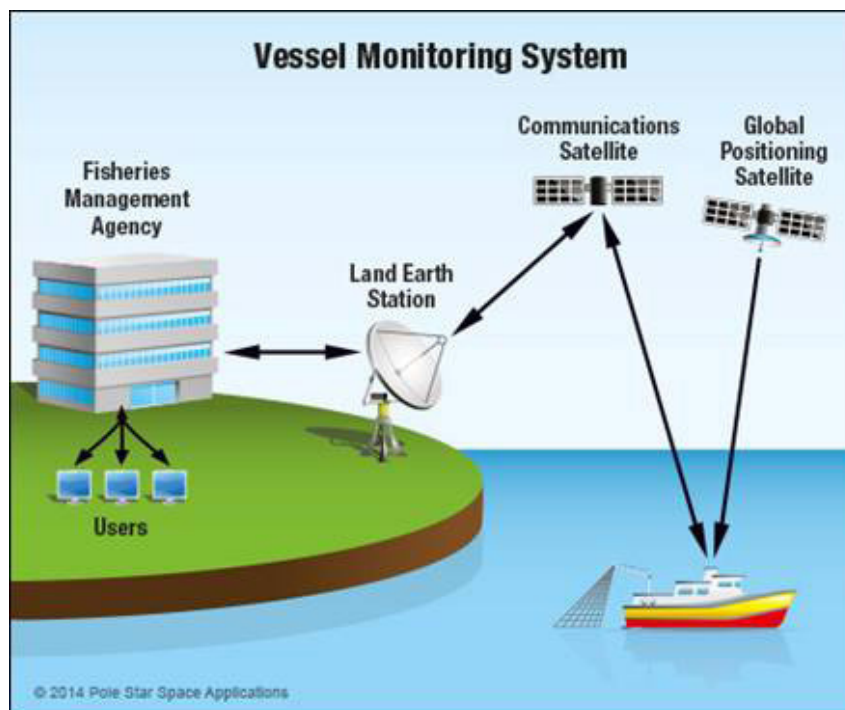
117. Australia Fisheries Management Act 1991, pt. 6; Australia Fisheries Management Regulations 1992, pt. 7. See also Observer Program, *supra* note 116.

118. Catch Disposal Records, AFMA, <https://www.afma.gov.au/monitoring-enforcement/catch-disposal-records> (last visited Feb. 22, 2019).

of processing for the landed fish, and the number of shark carcasses included in the catch.¹¹⁹

Fishers provide copies of their disposal records to both AFMA and to the fish receiver, who may be a fish processor, wholesaler, or retail fish market. The receiver records the species and weight of the fish, signs the form, and submits it to AFMA.¹²⁰ Catch disposal records may also be required for fisheries that are not subject to quotas to assist with stock assessments and for other purposes.¹²¹

Commercial fishing vessels are also required to install tracking devices as part of AFMA's satellite-based vessel monitoring system ("VMS"), which records and transmits to AFMA data relating to the vessels' locations, course, and speed. AFMA relies heavily on VMS to track fishing vessels' movements and verify their compliance with fishery management rules.¹²²



©<https://www.afma.gov.au/sites/default/files/uploads/2014/12/satellite-tracking-VMS-copyright-pole-star-space-applications.jpg>

119. Id.

120. Id.

121. Id.

122. Australia Fisheries Management Act 1991, art. 18(3)(g)(iii) ("Measures to be taken by a State in respect of vessels flying its flag shall include . . . the development and implementation of vessel monitoring systems, including, as appropriate . . . satellite transmitter systems . . ."); Satellite Monitoring of Fishing Boats, AFMA, <http://www.afma.gov.au/monitoring-enforcement/satellite-monitoring-fishing-boats/> (last visited Feb. 4, 2019); Vessel Monitoring System Requirements, AFMA, <http://www.afma.gov.au/fisheries-services/vessel-monitoring/> (last visited Feb. 4, 2019).

New Zealand

Fisheries New Zealand (“FNZ”), an agency within the New Zealand Ministry for Primary Industries, is responsible for the management of fisheries in New Zealand. FNZ is in the process of developing a fully digitized system of catch reporting through e-log books, global position reporting, and on-board electronic monitoring. These systems are designed to overlap and reinforce one another. For example, the global positioning system allows FNZ to verify information disclosed on e-logs concerning where and when fishing occurred, while on-board cameras allow FNZ to verify whether the electronic catch reporting is accurate.¹²³

Fishing vessels fishing under certain permits are required to have on-board cameras.¹²⁴ By the end of 2019, all commercial fishers are required to provide electronic catch and position reporting to FNZ.¹²⁵ Under the e-logbook requirements, a fisher is required to digitally complete and submit to FNZ “event reports” before the close of the day anytime the fisher fishes, processes, disposes, and/or lands fish.¹²⁶

Licensed fish receivers in New Zealand are required to complete and submit “licensed fish receiver returns” to FNZ each month, detailing the types and quantities of fish received during the preceding month as well as information identifying the fisher(s) who supplied the fish.¹²⁷ The New Zealand Fisheries Act also authorizes dockside monitoring, where monitors may inspect and weigh catch and verify the accuracy of information logged by commercial fishers concerning catch, effort, and landing.¹²⁸

Like Australia, New Zealand utilizes an on-board observer program.¹²⁹ FNZ may elect to place one or more observers on any fishing vessel with reasonable advance notice to the fisher. When so notified by FNZ, the fishing vessel must carry the observers and comply with the relevant rules, including by ensuring the vessel has the equipment necessary for the observers to carry out their duties; providing food and accommodations free of charge; and allowing observers access to information, records, and all areas of the vessel requested.¹³⁰

123. See generally Digital Monitoring of Commercial Fishing, Fisheries New Zealand, <https://www.fisheries.govt.nz/protection-and-response/sustainable-fisheries/strengthening-fisheries-management/fisheries-change-programme/digital-monitoring-of-commercial-fishing/> (last visited Feb. 14, 2019); Electronic Catch and Position Reporting, Fisheries New Zealand <https://www.fisheries.govt.nz/protection-and-response/sustainable-fisheries/strengthening-fisheries-management/fisheries-change-programme/electronic-catch-and-position-reporting/> (last visited Feb. 14, 2019).

124. New Zealand Fisheries (Electronic Monitoring on Vessels) Amendment Regulations 2019; New Zealand Fisheries (Electronic Monitoring on Vessels) Regulations 2017.

125. Digital Monitoring Update – December 2018, Fisheries New Zealand, <https://www.fisheries.govt.nz/dmsdocument/32536/loggedIn> (last visited Feb. 14, 2019).

126. New Zealand Fisheries (Reporting) Regulations 2017, pt. 1; New Zealand Fisheries (Reporting) Amendment Regulations 2018, pt. 7.

127. New Zealand Fisheries (Reporting) Regulations 2017, pt. 2.

128. New Zealand Fisheries Act 1996, sec. 300.

129. Id. pt. 12.

130. Id.

EU

In the EU, the fishery monitoring mechanisms are part of a “control system” included in the Common Fisheries Policy. The control system is set forth in Council Regulation (EC) No 1224/2009 Establishing a Community Control System for Ensuring Compliance with the Rules of the Common Fisheries Policy, also known as the Control Regulation.¹³¹ Since going into force in 2010, the Control Regulation has played a critical role in providing minimum monitoring requirements for EU member states.¹³² These minimum requirements are discussed below.

Vessel Monitoring System (“VMS”). The EU is the first region in the world to mandate VMS tracking for all larger fishing vessels.¹³³ Through this system, fishing authorities can monitor whether vessels are fishing in permitted locations during permitted periods. All member states of the EU are required to operate VMS to monitor the fishing vessels flying their respective flags. Fishing vessels of 12 meters in length or more must install on-board devices that automatically transmit position data to fishery authorities at least once every two hours.¹³⁴

Automatic Identification System (“AIS”). AIS is an autonomous and continuous vessel identification and monitoring system that allows fishing vessels to electronically exchange data with nearby ships and fishery authorities regarding their identification, position, course, and speed.¹³⁵ Whereas VMS is satellite-based and designed to locate vessels for regulatory purposes, AIS is ship-to-ship and shore-to-ship real-time communications used for situation awareness and navigation.¹³⁶ In the EU, all fishing vessels that are more than 15 meters in length are required to be equipped with AIS in addition to VMS. The data collected through AIS can also be used to cross-check other data collected by fishery authorities.¹³⁷

Vessel Detection System (“VDS”). VDS is another satellite-based system designed to detect the positions of vessels at sea.¹³⁸ Unlike VMS or AIS, VDS relies on remote technology that does not require vessels to be operating specified transmission equipment. VDS is designed to monitor vessels that do not have VMS or AIS equipment or may be intentionally disconnecting such equipment to avoid detection.¹³⁹ Members states must ensure that their fishery control

131. The EU’s Fisheries Control System, EU Fisheries, https://ec.europa.eu/fisheries/cfp/control_en (last visited Feb. 5, 2019).

132. See EC Press Release, Common Fisheries Policy: Commission Proposes New Rules to Step Up Enforcement (May 30, 2018), http://europa.eu/rapid/press-release_IP-18-3978_en.htm (last visited Feb. 5, 2019).

133. Vessel Monitoring System (VMS), EU Fisheries, https://ec.europa.eu/fisheries/cfp/control/technologies/vms_en.

134. EU Control Regulation, art. 9. See also Commission Implementing Regulation (EU) No 404/2011 of 8 April 2011 laying down detailed rules for the implementation of Council Regulation (EC) No 1224/2009, art. 18-22 [hereinafter EU Implementing Regulation].

135. Id. art. 4(11).

136. See U.S. Dep’t of Homeland Sec., How Does AIS Compare and Contrast With VMS?, https://www.navcen.uscg.gov/pdf/AIS/Q_AIS_vs_VMS_Comparison.pdf (last visited Feb. 4, 2019).

137. EU Control Regulation, art. 10.

138. Id. art. 4(13).

139. See Agric. & Fisheries Unit, FISHREG, The Vessel Detection System (2007), http://ec.europa.eu/research/press/2007/maritime-briefing/pdf/43-vessel-detection-system-fisheries_en.pdf (last visited Feb. 5, 2019).

authorities have the technical capacity to use VDS and are encouraged to use VDS to cross-check position data received from other sources.¹⁴⁰

Logbooks and Declarations. In the EU, fishing vessels of 10 meters or more in length must keep a fishing logbook and submit landing and transshipment declarations. Fishing vessels of 12 meters or more in length are required to keep a fishing logbook in electronic form (also known as an e-logbook), and must submit landing and transshipment declarations to fishery authorities by electronic means.¹⁴¹ Information that should be recorded in a fishing logbook includes: the identification number and name of the fishing vessel; the dates of departure from and arrival to port; the duration of the fishing trip; the type of gear; mesh size and dimension of nets used; the number of fishing operations; the species caught; the areas fished; the date of catch; the estimated quantities or weight of each species caught; and, where appropriate, the estimated discards above 50 kilograms for any given species. Fishing vessels less than 10 meters in length, which are not subject to logbook requirements, are monitored through sampling upon landing.¹⁴²

Onboard Control Observers. As in Australia and New Zealand, the fishery authorities within member states of the EU may identify vessels to carry observers on board.¹⁴³ Fishing vessels must provide observers with “adequate accommodation,” facilitate their work, and avoid interference with the discharge of their duties, which include verifying the vessel’s relevant documents, recording the vessel’s fishing activities, completing observer reports, and reporting any serious infringement to the competent fishery authorities.

Landing Obligation.¹⁴⁴ Since 2015, the EU has phased in a landing obligation, which requires commercial fishers to land, record and count all catches against applicable quotas. Exceptions apply for catches below de minimis thresholds for which increased selectivity is impractical, prohibited species (which, if accidentally caught, must be returned to the sea), and catches of species for which scientific evidence demonstrates high survival rates. The landing obligation thus applies to species subject to quotas, such as mackerel, and species that are subject to a minimum landing size, such as gilt-head sea-bream. The landing obligation is intended to end the practice of discarding less profitable fish back into the sea, which has been proven to be bad for fish stocks, bad for the marine environment and costly for fishermen.¹⁴⁵ By requiring the fisher to land, record, and count all catches, the EU hopes to increase selectivity, reduce unwanted

140. EU Control Regulation, art. 11.

141. *Id.* whereas (17) & (18); art. 14-15.

142. *Id.* art. 16.

143. *Id.* art. 73; see also EU Implementation Regulation, art. 93-96.

144. CFP 2013, art. 14-15.

145. Maritime Affairs and Fisheries, EC, EU Getting on Board with the Landing Obligation (Mar. 2015), https://ec.europa.eu/dgs/maritimeaffairs_fisheries/magazine/en/policy/eu-getting-board-landing-obligation (last visited Feb. 4, 2019).

catches, and eliminate the wasteful practice of discarding through better fishing practices.¹⁴⁶ By the end of 2019, the landing obligation will be required for all commercial fisheries in EU waters and for EU fishing vessels fishing in the high seas.

Designated Ports and Port Inspections. For certain sensitive species and large-volume landings, member states of the EU may designate a limited number of ports, which are better equipped to receive such landings.¹⁴⁷ This improves the ability of fishing authorities to monitor and inspect specific types of catches.

United States

In the United States, both fishers and fish dealers are required to independently complete and submit logbook records, enabling NOAA to cross-check and verify the information recorded.¹⁴⁸ Information required to be recorded in logbooks includes effort, location, and bycatch for every trip and harvest event. For paper logbooks, fishers retain a copy, give one copy to the fish dealer, and send another copy to the regulator. Upon receiving the fish, the fish dealers must record information concerning the catch, the fisher from whom the catch was received, and the market price for the catch. The logbooks produced by the fisher and fish dealer combine to form a “trip-ticket,” which serves as a complete record of effort, location and catch for every fishing trip.¹⁴⁹ Many, though not all, fisheries require fish dealers to use e-logbooks to report production and landing data.¹⁵⁰

Like its counterparts in Australia, New Zealand, and the EU, NOAA Fisheries oversees a VMS system to monitor the location and movement of commercial fishing vessels in the United States.¹⁵¹ Other monitoring mechanisms vary across the fishery regions in the United States and by fishery. For example, as of May 2018, e-monitoring programs have been implemented in five U.S. fisheries, including the Atlantic pelagic longline fishery. These programs require fishing vessels to install video cameras and sensors to capture information on fishing location, catch, and discards and to transmit such data to fishery regulators.¹⁵²

146. Discarding is the practice of returning unwanted catches to the sea, either dead or alive, because they are undersized, the fisher has no quota or there is no market demand, or because catch composition rules requires it. Discarding may lead to waste, especially under a system where only the landed portions of the catches are required to be reported and recorded.

147. EU Control Regulation, art. 43. See also Designated Ports, EU Fisheries, https://ec.europa.eu/fisheries/cfp/control/designated_ports_en (last visited Feb. 4, 2019).

148. Derek Southern, United States Marine Fisheries Electronic-Catch Reporting: Status Report and Recommendations 2-3, eScholarship.org (April 1, 2017), available at <https://cloudfront.escholarship.org/dist/prd/content/qt7d14s9zv/qt7d14s9zv.pdf?t=p58jbs&nosplash=f258bc11e4e192f39d1859fcad19ed7c> (last visited Feb. 14, 2019).

149. Id.

150. Id. at 4.

151. Vessel Monitoring, NOAA Fisheries, <https://www.fisheries.noaa.gov/topic/enforcement/vessel-monitoring> (last visited Feb. 4, 2019).

152. Electronic Monitoring, NOAA Fisheries, <https://www.fisheries.noaa.gov/national/fisheries-observers/electronic-monitoring> (last visited Feb. 5, 2019).



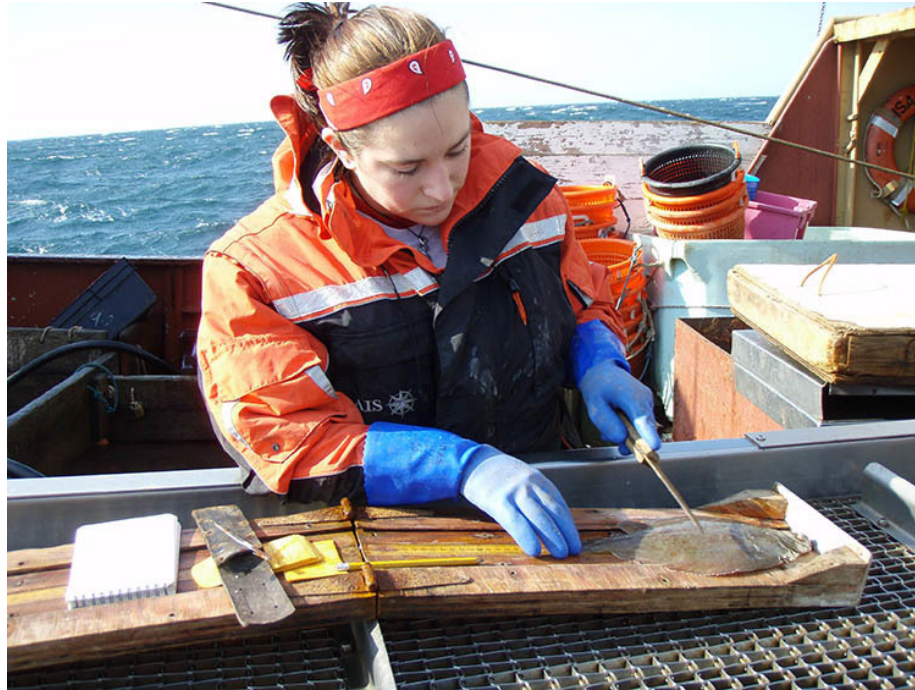
©<https://www.st.nmfs.noaa.gov/advanced-technology/electronic-monitoring/em-er-explained>

Some fisheries, such as groundfish and halibut fisheries in Alaska, also require commercial fishing vessels to carry at-sea observers.¹⁵³ In other fisheries, observers are placed on a portion of vessels based on monitoring needs, statistical sampling protocols, and other factors.¹⁵⁴

153. See, e.g., 16 U.S.C. § 1881b.

154. See generally Samantha G. Brooke, Federal Fisheries Observer Programs in the United States: Over 40 Years of Independent Data Collection, 76 Marine Fisheries Review 1-38 (Jan. 2015), available at <https://spo.nmfs.noaa.gov/sites/default/files/pdf-content/mfr7631.pdf>.

Observer collecting scale samples from a yellowtail flounder. Scales can be used to estimate the age of the fish. This information, combined with the length of the fish will add to the robustness of the stock assessment.



©<https://www.nefsc.noaa.gov/fsb/forms/>

ENFORCEMENT MEASURES

The regulatory regimes in every country and region discussed in this white paper incorporate enforcement measures to encourage accountability and deter violations. Persons committing fishery-related offenses are typically subject to administrative sanctions and civil penalties ranging from warnings to fines. The most serious offenses can also give rise to criminal prosecutions.

UNCLOS

UNCLOS does not specify how fishery-related offenses should be punished. Instead, UNCLOS permits its members to develop and implement their own enforcement measures.

Australia

In Australia, violations of fishery regulations may subject offenders to administrative, civil, and criminal punishment.¹⁵⁵ Minor offenses, such as those that cause minimal impact to the fishery, are of a minor technical nature, constitute a first offense, or can be quickly addressed, may give rise to only a verbal warning. For more serious breaches, offenders may receive formal “Commonwealth Fisheries Infringement Notices,” which require the offenders to pay a fine.¹⁵⁶ For individual offenders, such a fine will be no more than \$2,520 AUD per infringement (approximately USD \$1,800); for a corporate offender, the fine will be no more than \$12,600 AUD per infringement (approximately USD \$9,000).¹⁵⁷

Fishery offenses may also affect one’s fishing rights and conditions. For instance, a fisher’s right to fish may be suspended or canceled in response to a fisher’s failure to pay a fee, a breach that causes an unacceptable impact, consistent non-compliance with regulations, or evidence of a deliberate attempt to gain financial advantage from non-compliance.¹⁵⁸ The fishery regulators may also modify the conditions associated with a fishing permit to ensure the offender’s future compliance.¹⁵⁹

155. See generally AFMA, National Compliance and Enforcement Policy 2017, at 26-29.

156. Australia Fisheries Management Regulations 1992, pt. 10.

157. [face-increased-fines-fisheries-offences](#) (last visited Feb. 12, 2019).

158. Australia Fisheries Management Act 1991, sec. 38-39.

159. *Id.*

In instances of imminent risk of severe impact, fishery regulators may also direct a fishing vessel to (1) cease fishing activity; (2) be taken to a particular place; and/or (3) stop to allow an “at-sea” boarding.¹⁶⁰ Lastly, fishery regulators may refer certain fishery offenses for criminal prosecution, where there is evidence of a breach of the Fisheries Management Act 1991 and fishery regulators determine that prosecution is the most appropriate response to deter an individual from committing further offenses or to deter the general public from engaging in similar offenses.¹⁶¹

New Zealand

New Zealand relies extensively on forfeiture as an enforcement tool. Offenders may be required to forfeit ill-gotten fish, proceeds from the sale of such fish, fishing gear or other property used to commit the offense, and any quota rights related to the offense.¹⁶² Fishers and fish receivers who fail to fulfill certain reporting obligations, called “infringement offenses,” are subject to “infringement fees” of up to \$750 NZD (approximately USD \$515).¹⁶³ For example, failing to complete a disposal report within eight hours after fishing is punishable by \$400 NZD. For other, more serious fishery offenses, financial penalties may range from a maximum of \$5,000 NZD (approximately USD \$3,433) for such minor offenses as failing to notify the regulator of a change in vessel ownership, to \$100,000 NZD (approximately USD \$69,000) for breaching a condition of a fishing permit, to \$250,000 NZD (approximately USD \$172,000) for unlawfully dumping fish, and to \$500,000 NZD (approximately USD \$343,000) for fishing New Zealand’s waters in an unlicensed foreign vessel.¹⁶⁴ Certain offenses, such as knowingly making a false statement, are prosecutable under criminal law in New Zealand and punishable by up to five years imprisonment.¹⁶⁵

EU

In the EU, nation-specific enforcement measures are supplemented by rules established in Council Regulation (EC) No 1005/2008 of 29 September 2008 to prevent, deter and eliminate illegal, unreported and unregulated fishing (the “IUU Regulation”). The enforcement measures and sanctions prescribed in the IUU Regulation apply only to “serious infringements.” Serious infringements include:

160. Australia Maritime Powers Act 2013, sec. 69.

161. Australia Fisheries Management Regulations 1992, pt. 9A. See also Australia Fisheries Management Regulations 1992.

162. Australia Fisheries Act 1996, art. 255A -255D.

163. Australia Fisheries (Infringement Offenses) Regulations 2001.

164. Id. art. 252.

165. Id. art. 260A.

- fishing without a valid license;
- failing to report catch-related data;
- fishing in a closed area;
- fishing after attainment of a quota;
- using prohibited fishing gear;
- falsifying vessel markings;
- obstructing inspectors or observers; and
- taking on board, transshipping or landing undersized fish in contravention of applicable regulations.¹⁶⁶

Specific sanctions for serious infringements are largely left to the member states to prescribe, though the IUU Regulation provides that a maximum sanction of five times the value of the fishery products obtained through the offense may be imposed. In the case of multiple serious infringements within a five-year period, the IUU Regulation provides for a sanction equal to at least eight times the value of the fishery products obtained.¹⁶⁷ The IUU Regulation also requires member states to take into account the value of the prejudice to the fishing resources and the marine environment when applying these sanctions. Such monetary penalties can be accompanied by other measures, including

- warnings;
- sequestration or temporary immobilization of the fishing vessel;
- confiscation of prohibited fishing gear, catches or fishery products; and
- reduction, suspension or revocation of fishing rights.¹⁶⁸

Criminal sanctions may be applied to certain offenses by member states as an alternative or in addition to the sanctions described above.¹⁶⁹ Lastly, the EU has established a point system in connection with its fishing license system according to which pre-set penalty points are attributed to a fishing vessel's license for each serious infringement committed by that vessel. Once the points reach a certain level, the license is suspended.¹⁷⁰

166. IUU Regulation, art. 3 & 42.

167. Id. art. 44.

168. Id. art. 45.

169. Id. art. 44.

170. EU Control Regulation, whereas (40) ("The establishment of sanctions should be complemented by a point system for serious infringements on the basis of which a fishing license should be suspended if a certain number of points have been attributed to the holder of a fishing license following the imposition of sanctions for serious infringements."); see also Point System for Serious Infringement, EU Fisheries, https://ec.europa.eu/fisheries/cfp/control/infringements_sanctions/point_system_en (last visited Feb. 22, 2019).



©https://ec.europa.eu/fisheries/cfp/illegal_fishing_en

United States

In the United States, the Magnuson-Stevens Act provides four basic enforcement remedies for fishery-related violations, in ascending order of severity: ¹⁷¹ (1) citations issued by the fishery officers at the scene of the offense; ¹⁷² (2) civil monetary penalties;¹⁷³ (3) forfeiture of a vessel, fishing gear, cargo, and catch or the fair market value thereof;¹⁷⁴ and (4) criminal prosecution of the owner or operator.¹⁷⁵ Where appropriate, these remedies may be applied in combination.

When assessing penalties, NOAA takes into account the following factors: the nature, circumstances, extent, and gravity of the alleged violation; the alleged violator's degree of culpability; the alleged violator's history of prior offenses; the alleged violator's ability to pay the

171. 50 C.F.R. 600.740.

172. 15 C.F.R. Pt. 904, Subpt. E.

173. 15 C.F.R. Pt. 904, Subpt. B.

174. 16 U.S.C. § 1860.

175. 16 U.S.C. § 1859.

penalty; and such other matters as justice may require.¹⁷⁶ A monetary penalty for a violation under the Magnuson-Stevens Act can range from USD \$2,000 for unintentional and lower-level offenses, to a maximum of USD \$140,000 per violation for an intentional offender committing a serious violation, such as tampering with or distorting the data of a VMS unit.¹⁷⁷

In addition, regardless of whether civil and/or criminal penalties are imposed, NOAA regulators may impose sanctions on permit holders by revoking, suspending, or denying a fishing permit or imposing additional conditions and restrictions on an existing fishing permit where the fisher violates any provision of the Magnuson-Stevens Act or otherwise commits a violation proscribed by Section 307 of the Act.¹⁷⁸

CONCLUSION

The regulatory regimes set out in UNCLOS and utilized in Australia, New Zealand, the EU, and the United States provide examples for fishing nations seeking to maintain or restore their fisheries. Each regime sets a sustainability standard and relies on the pertinent available science to develop and implement output controls, such as TACs, and input controls, such as limiting the number of commercial fishing permits, to achieve this standard. The regimes use a suite of monitoring systems to monitor compliance with management and track management success, as well as robust enforcement measures to punish and deter offenders. These common characteristics have significantly contributed to the relative management success of these regulatory regimes.

176. 15 C.F.R. § 904.108(a). See also NOAA Office of The Gen. Counsel, Policy for Assessment of Civil Administrative Penalties and Permit Sanctions, at 3 (July 1, 2014), [hereinafter NOAA Policy on Civil Penalties], available at, https://www.gc.noaa.gov/documents/Penalty%20Policy_FINAL_07012014_combo.pdf (last visited Feb. 22, 2019).

177. See NOAA Policy on Civil Penalties, *supra* note 176, at 4, 23 & 35.

178. 16 U.S.C. § 1858.

APPENDIX 1

LAWS AND POLICIES ANALYZED FOR FISHERIES REGULATORY REGIMES

International Treaties

United Nations Convention on the Law of the Sea 10 December 1982

United Nations Agreement for the Implementation of Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks 4 August 1995

Australia

Statutes & Regulations

- Fisheries Administration Act 1991
- Fisheries Management Act 1991
- Fisheries Resource Management Act 1994
- Maritime Powers Act 2013
- Fisheries Management Regulations 1992
- Fisheries Management Regulations (Amendment) 1997
- Australia Fisheries (Infringement Offenses) Regulations 2001

Policies and Guidelines

- Commonwealth Fisheries Harvest Strategy Policy and Guidelines 2007
- Commonwealth Fisheries Harvest Strategy Policy: Framework for Applying an Evidence-based Approach to Setting Harvest Levels in Commonwealth Fisheries 2018
- Guidelines for the Implementation of the Commonwealth Fisheries Harvest Strategy Policy 2018
- Southern Squid Jig Fishery (Total Allowable Effort) Determination 2018

New Zealand

Statutes & Regulations

- Fisheries Act 1996
- Fisheries (Reporting) Regulations 2017
- Fisheries (Reporting) Amendment Regulations 2018
- Fisheries (Commercial Fishing) Regulations 2001

- Fisheries (Commercial Fishing) Amendment Regulations 2018
- Fisheries (Geospatial Position Reporting) Regulations 2017
- Fisheries (Geospatial Position Reporting) Amendment Regulations 2018
- Fisheries (Electronic Monitoring on Vessels) Regulations 2017
- Fisheries (Electronic Monitoring on Vessels) Amendment Regulations 2019
- Fisheries (Infringement Offences) Regulations 2001
- Fisheries (Infringement Offences) Amendment Regulations 2018
- Fisheries (Recordkeeping) Regulations 1990
- Fisheries (Licensed Fish Receivers) Regulations 1997

Policies & Guidelines

- Operational Guidelines for New Zealand's Harvest Strategy Standard

European Union

- Regulation (EC) No 1380/2013 of the European Parliament and of the Council of 11 December 2013 on the Common Fisheries Policy [the "Common Fishery Policy"]
- Council Regulation (EC) No 1224/2009 Establishing a Community Control System for Ensuring Compliance with the Rules of the Common Fisheries Policy [the "Control Regulation"]
- Council Regulation (EC) No 1005/2008 of 29 September 2008 establishing a Community system to prevent, deter and eliminate illegal, unreported and unregulated fishing [the "IUU Regulation"]
- COUNCIL REGULATION (EU) 2018/120 of 23 January 2018 fixing for 2018 the fishing opportunities for certain fish stocks and groups of fish stocks
- Council Regulation (EC) No 676/2007 of 11 June 2007
- Commission Implementing Regulation (EU) 2017/218 on the Union fishing fleet register

United States

Statutes and Regulations

- The Magnuson-Stevens Fishery Conservation and Management Act of 1976 (16 U.S.C. §§ 1801-1891d)
- 15 C.F.R. Part. 904
- 50 C.F.R. PART 600 - Magnuson-Stevens Act Provisions
- 50 C.F.R. PART 622 - Fisheries of the Caribbean, Gulf of Mexico, and South Atlantic
- 50 C.F.R. PART 635 - Atlantic Highly Migratory Species

- 50 C.F.R. PART 648 - Fisheries of The Northeastern United States
- 50 C.F.R. PART 660 - Fisheries off West Coast States
- 50 C.F.R. PART 665 - Fisheries in the Western Pacific
- 50 C.F.R. PART 679 - Fisheries of the Exclusive Economic Zone off Alaska
- 50 C.F.R. PART 680 - Shellfish Fisheries of the Exclusive Economic Zone off Alaska
- 50 C.F.R. PART 697 - Atlantic Coastal Fisheries Cooperative Management

Cases:

- N. Carolina Fisheries Ass'n, Inc. v. Gutierrez, 518 F. Supp. 2d 62, 85 (D.D.C. 2007)
- S. Offshore Fishing Ass'n v. Daley, 995 F. Supp. 1411, 1432 (M.D. Fla. 1998) (citing Associated Fisheries of Maine, Inc. v. Daley, 954 F. Supp. 383, 389 (D. Me. 1997))

Policies and Guidelines

NOAA Office of The Gen. Counsel, Policy for Assessment of Civil Administrative Penalties and Permit Sanctions (July 1, 2014)

APPENDIX 2

COMPARATIVE ANALYSIS OF REGULATORY REGIMES

Country / Region	Sustainability Standard	Science-Based Management	Types of Fishing Mortality Control Mechanisms	Permits, Licenses and Vessel Registration	Monitoring Mechanisms	Enforcement Measures
The UN Convention on the Law of the Sea ("UNCLOS")	Maximum Sustainable Yield	"The coastal State, taking into account the best scientific evidence available to it, shall ensure through proper conservation and management measures that the maintenance of the living resources in the exclusive economic zone is not endangered by over-exploitation . . ."	None at the U.N. level; to be adopted by member states.	None at the U.N. level	None at the U.N. level; to be adopted by member states.	None at the U.N. level; to be adopted by member states.
Australia	Maximum Economic Yield	"All key decisions" concerning Australia's fishery regulations must be based on the "best available science."	Output Control • TAC; ITQs; • minimum size • bag/possession limit Input Control • Total Allowable Effort – including number of fishing boats, type/amount of gear, etc. • Closures • Limited entry	Fishing permits to individual fishers Fish receiver permit for fish dealers, marketers, and processors	Paper logbooks and e-logbooks E-monitoring Catch Disposal Records At-sea Observers Vessel Monitoring System	• Verbal Warnings • Commonwealth Fisheries Infringement Notices (with a fine) • Permit sanctions: amendment to, suspension/cancellation of fishing permits • Directions by fisheries officers for a boat to (1) cease fishing activity, (2) be taken to a particular place, and/or (3) stop so as to allow an "at-sea" boarding. • Criminal Prosecution
New Zealand	Maximum Sustainable Yield	All decisions "in relation to the utilization of fisheries resources or ensuring sustainability," including the setting of TAC, should be made on the basis of "the best available information."	Output Control • QMS (TAC; TACC; ITQ) • Minimum size/age limitations Input Control • Restrictions on fishing gear and methods • Minimum mesh size • Closures • Discard ban	Fishing permits Fish receiver licensing requirement Commercial fishing vessel registration	E-monitoring Paper and/or Electronic logbook ("event reports" by fishers) Geospatial position reporting Fish receiver returns On-board observers Dockside monitoring	• Forfeiture of illegal catch, sale proceeds, fishing gear or other property used to commit the offense, and/or any quota related to the offense • Infringement Notices & Fees for "infringement offenses" • Criminal prosecution

Country / Region	Sustainability Standard	Science-Based Management	Types of Fishing Mortality Control Mechanisms	Permits, Licenses and Vessel Registration	Monitoring Mechanisms	Enforcement Measures
European Union	Maximum Economic Yield	Fisheries management measures, including allowable catches, should be made "on the basis of the best available scientific advice."	Output Control - TAC/National quotas (i.e., fishing opportunities) Input Control - Maximum fishing effort (i.e., limitations on amount of time that can be spent at sea by a fleet) - Minimum landing sizes - Minimum mesh sizes - Closed areas - Closed seasons - Specifications for design and use of gear	Fishing License to boats	Vessel Monitoring System Vessel Detection System Automatic Identification System Paper Logbooks + Landing Declarations / E-Logbooks Onboard Control Observers Landing obligation Designated Ports & Port Inspections	Sanctions for "serious infringements" to be prescribed by member nations subject to certain EU-wide standards; can include a monetary sanction, accompanied by any of the following: - Warnings - sequestration of fishing vessel - temporary immobilization of the fishing vessel - confiscation of prohibited fishing gear catches or fishery products - suspension/revocation of fishing authorization or license - reduction or withdrawal of fishing rights Point system for "serious infringements" criminal sanctions (by member states)
United States	Optimum Yield	Fishery conservation and management measures shall be based on the "best scientific information available." TACs "may not exceed the fishing level recommendations of its scientific and statistical committee or the peer review process"	Output Control - TAC; individual fishing quotas; "Limited Access Privilege" programs - Minimum size limit - Bag and possession limits Input Control: - Gear limitations - Area Closures - Seasonal Closures	Commercial vessel permits Federal Fisheries Permits License for certain species Fish receiver permits	Logbooks for fishers and fish receivers (the "trip-ticket" system) Vessel Monitoring System Camera-based e-monitoring At-sea observers	Sanctions for violations of the Magnuson-Stevens Act - citations - civil money penalties - forfeiture - criminal prosecution - Permit Sanctions



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