Supplemental Material (not copyedited or formatted) for: Heidi Albers, Madison Ashworth, Tabaré Capitán, Róger Madrigal-Ballestero, Louis Preonas. 2021. "MPAs and Aspatial Policies in Artisanal Fisheries."
Marine Resource Economics 36(4). DOI: https://doi.org/10.1086/715818.

Appendix for "MPAs and Aspatial Policies in Artisanal Fisheries"

This appendix provides more results and details in support of the related article, in 10 sections:

For more detail about the spatial setting, dispersal matrix, and solution method, please see Albers et al., 2020.

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A. Open Border Case

To reflect other common marinescape settings, we explore two open border cases. In the open border – low case, we assume that the stock outside the marinescape is low and fish disperse out of border sites (sites 1, 3, 4 and 6). In the open border – high case, we assume that the fish stock outside the marinescape is higher than within, which results in net dispersal into the marinescape. We operationalize open marinescape borders by defining a *meta-marinescape* with the focal marinescape extended by one column on each side. We set the stock levels in the extra columns as high or low, with the density-dependent dispersal process operates in the *meta-marinescape* and resulting in dispersal into or out of the focal marinescape.

No MPA Setting. Borders that permit fish dispersal in and out of the marinescape change the fish stocks in columns 1 and 3 in response to that dispersal, with high (low) fish stocks outside the marinescape causing dispersal into (out of) the marinescape and higher (lower) stocks in the border column sites. Because fishers choose their fishing sites based in part on the stock of fish in each site, the three border cases differ in the baseline. First, high (low) out-marinescape stock levels lead to higher (lower) stocks in the marinescape, which attracts (repels) villagers into (out of) fishing (Figures A1, D2, D3). In the high-outside open border case, 13 villagers fish, with at least one fisher in all sites and 2 villagers specialize in wage work. Dispersal offsets the distance costs associated with traveling to site 6, which leads 1 fisher to choose that site, while dispersal's impact on stocks supports 6 fishers near the village in site 1 (instead of 4 in the closed borders case). As compared to the closed border case, total income and total fishing labor are higher. In contrast, in the low-outside open border setting, 7 villagers specialize in wage income, with most fishers located near the village in site 1 (Figures A1, D3). The dispersal out of the marinescape reduces the value of fishing in the border columns, which creates 2 sites – 4 and 6 --

with no fishing. The lower stocks in the marinescape translate to more wage income but to lower incomes overall in this border setting.

MPA with open borders – high outside marinescape stocks. As above, this border setting leads to higher fish stocks in the marinescape as compared to the closed border case, especially in the side column sites, which influences fisher decisions and the optimal MPA site and enforcement level. At high enough budgets, the ASL-maximizing manager protects site 1 at a level of enforcement that deters fishing in the MPA, causing a total of 3 additional fishers to become wage specializers as compared to open access (Figure A1). The MPA creates dispersal that supports more fishers in sites 2 and 4, and site 5 contains no fishers while site 6 supports two fishers due to dispersal from outside the marinescape and site 5. At budgets that cannot induce exit from fishing, the ASL-max MPA's site varies across budgets to produce the highest reduction in fishing labor on the marinescape, sometimes leveraging distance costs (budget 2; enforcement at a distance leads to a site change for one fisher) or dispersal (budget 3; enforcement in site 4 leads to fishers in neighboring sites) to induce a change in fisher site choice.

With these high stock levels, the income costs to open-access overharvesting are lower than in the closed borders case. At high enough budgets, the income-maximizing manager locates the MPA in site 1 with a high enough enforcement level to induce exit by 2 fishers, ongoing harvest in the MPA by 3 fishers, and leakage and spatial adjustments by fishers to capture dispersal from the MPA in sites 2 and 4 (Figure A2). At low budgets (1 and 2), the income-maximizing manager locates the MPA in site 4 and 2 respectively, which reduces fishing effort but does not lead to a redistribution of fishers relative to open access. Intermediate budgets induce exit from fishing with an MPA in site 1.

MPA with open borders – low outside marinescape stock levels. As above, this border setting creates lower stocks as fish disperse out of the marinescape, especially in the side column sites. Across moderate to unlimited budgets, the ASL-maximizing manager sites the MPA in site 1 at a high enough enforcement level to induce one fisher to exit fishing but two fishers fish illegally in the MPA (Figure A1). This manager does not increase enforcement to deter fishing from that location because higher enforcement levels induce fishers to leak their effort to other sites rather than become wage specializers. With fish dispersing out of the marinescape from site 1, inducing fishers to move out of site 1's MPA leads to low stocks in other sites in addition to low stocks from out-marinescape dispersal in site 1; ASL is maximized without complete enforcement in the MPA due to dispersal and leakage of fisher effort.

At high enough budgets, the income-maximizing manager protects site 2 to increase dispersal, and stock, in the site closest to the village and induces one fisher to exit and become a wage-specializer (Figure A2). As compared to open access, the MPA solves some open access overexploitation to increase incomes but also leverages dispersal to reduce travel costs for fishers. At lower budgets, this manager protects the site nearest to the village (site 1), with levels of enforcement that induce exit from fishing but cannot leverage dispersal to limit distance costs.

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Figure A1. ASL-maximizing MPA for different border settings

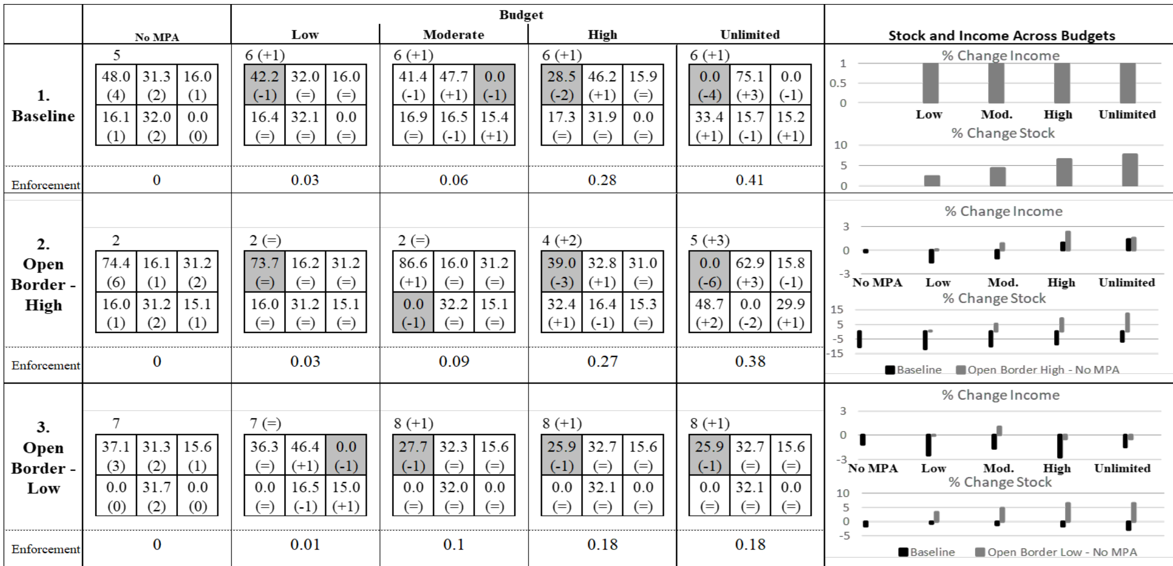

Figure A1. ASL-maximizing manager's optimal MPA siting and enforcement level across enforcement budgets for each border setting. The first column depicts the open access distribution of villagers. The number of villagers in each site is identified in the marinescape figure, and the number of villagers who choose not to fish is indicated by that number in the village location on the marinescape. The highlighted site is the optimal site for the ASL-maximizing manager for each border setting.

Figure A2. Income-maximizing MPAs for different border settings

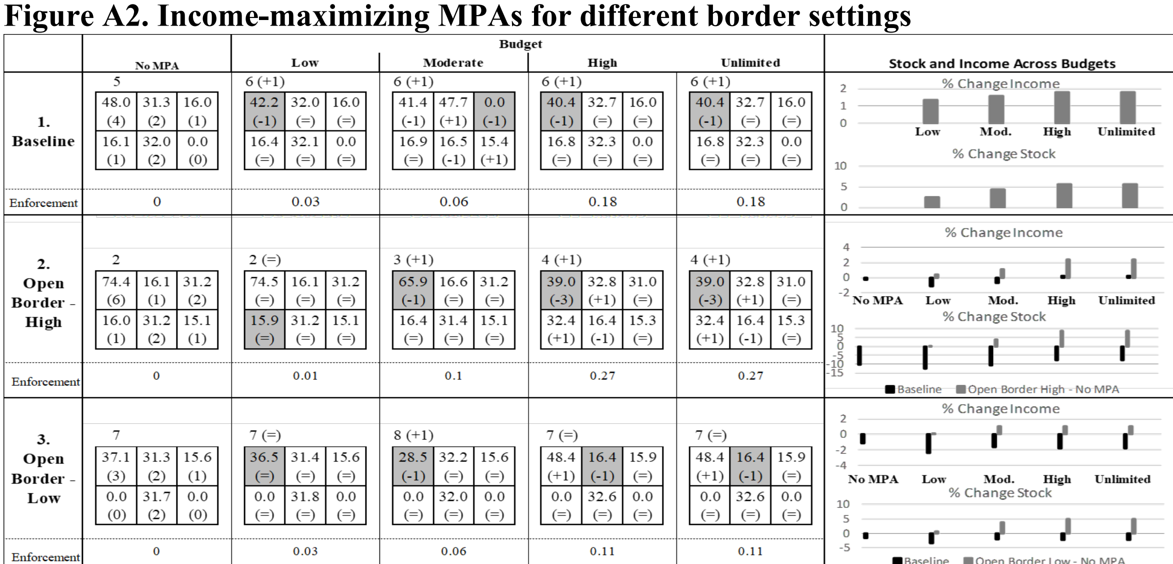

Figure A2. Income-maximizing manager's optimal MPA siting and enforcement level across enforcement budgets for each open border setting. The first column depicts the open access distribution of villagers. The number of villagers in each site is identified in the marinescape figure, and the number of villagers who choose not to fish is indicated by that number in the village location on the marinescape. The highlighted site is the optimal site for the income-maximizing manager for each border setting.

B. No-Dispersal Case and Homogenous Distance Case

To reflect other settings and common assumptions in management and modeling, we explore two additional marinescape settings within the closed border scenario: zero dispersal and homogenous fisher distance costs. Most recent fishery management and economic models recognize that fish move, but considering a no-dispersal case reflects settings of sedentary marine resources such as benthic resources and identifies links to protected areas in terrestrial settings with trees that do not move.[1] In contrast, most fishery management and economic models (implicitly) assume that fisher distance costs are homogenous, which we model here. In addition, we calculate the mistakes made by managers or modelers that assume zero dispersal or homogenous fisher distance costs in siting MPAs.

Zero Dispersal. The no-dispersal open access setting supports less fishing with an additional 3 wage-specializers. Fishers distribute evenly across the landscape with 2 fishers in site 1 and one fisher in every other site. The low distance costs in site 1 make it profitable for two fishers to fish in site 1, whereas distance costs to the other sites restrict the number of fishers to 1. (Figure B1). With dispersal as in the baseline, levels of fishing can be supported through dispersal that allow fishers to avoid some distance costs, but, without dispersal, more fishers choose to avoid the distance costs and work for wage instead. The resulting marinescape stocks are higher in the no dispersal case due to the lower levels of fishing and higher income levels because that lower level of fishing solves some of the open-access over-extraction problem. The ASL-maximizing manager in the no dispersal case sites MPAs to deter fishing and create exit from fishing, however, it is unable to induce to exit from fishing until moderately high budget

[1] Our framework is not as useful for exploring other fishery and MPA settings that contain just one fish site at a larger scale than fishing and MPA zoning, which removes the spatial aspects of decisions as the common pool resource is accessed from any location.

levels (10 or higher). When budget is unconstrained, the manager protects the site next to the village until complete deterrence (as in the baseline case), but because there is no dispersal, nearby sites do not see their stocks increase and fishers do not get an extra incentive to fish there (Figure B1). When this naïve-to-dispersal ASL manager's MPA is implemented in a setting with dispersal, the manager receives 20 to 100% of the gains over open access that the optimal ASL maximizer who recognizes dispersal generates at those budgets. Without dispersal, there is little room for income increases using MPAs (the distribution of fishers remains the same at any budget level, Figure B2). When this manager's MPA is implemented in a setting with dispersal, the manager receives approximately 60% of the gains over open access that the optimal income maximizer who recognizes dispersal receives at an unconstrained budget. At constrained budgets (2 and 3), the naïve manager can get within 89% – 97% of the gains over open access that the manager who recognizes dispersal receives. For both ASL and income-maximizing managers, selecting MPAs without reflecting the dispersal setting misses opportunities to achieve higher levels of conservation and income.

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B1: ASL-max MPA with no dispersal

	No MPA	Budget: Low	Budget: Moderate	Budget: High	Budget: Unlimited
1. Baseline	5 48.0 (4), 31.3 (2), 16.0 (1) 16.1 (1), 32.0 (2), 0.0 (0)	6 (+1) 42.2 (-1), 32.0 (=), 16.0 (=) 16.4 (=), 32.1 (=), 0.0 (=)	6 (+1) 41.4 (-1), 47.7 (+1), 0.0 (-1) 16.9 (=), 16.5 (-1), 15.4 (+1)	6 (+1) 28.5 (-2), 46.2 (+1), 15.9 (=) 17.3 (=), 31.9 (=), 0.0 (=)	6 (+1) 0.0 (-4), 75.1 (+3), 0.0 (-1) 33.4 (+1), 15.7 (-1), 15.2 (+1)
Enforcement	0	0.03	0.06	0.28	0.41
2. No Dispersal	8 29.1 (2), 18.5 (1), 16.1 (1) 18.1 (1), 17.2 (1), 15.3 (1)	8 (=) 29.1 (=), 18.5 (=), 16.1 (=) 18.1 (=), 17.2 (=), 15.3 (=)	8 (=) 30.0 (=), 18.5 (=), 16.1 (=) 18.1 (=), 17.2 (=), 15.3 (=)	9 (+1) 29.1 (=), 18.5 (=), 0.0 (-1) 18.1 (=), 17.2 (=), 15.3 (=)	10 (+2) 0.0 (-2), 18.5 (=), 16.1 (=) 18.1 (=), 17.2 (=), 15.3 (=)
Enforcement	0	0.03	0.1	0.33	0.66
3. No Dispersal - Strawman	5 48.0 (4), 31.3 (2), 16.0 (1) 16.1 (1), 32.0 (2), 0.0 (0)	8 (=) 48.4 (4), 31.0 (2), 16.0 (1) 16.1 (1), 32.1 (2), 0.0 (0)	6 (+1) 41.5 (-1), 32.3 (=), 16.0 (=) 16.6 (=), 32.2 (=), 0.0 (=)	9 (+1) 52.8 (4), 16.0 (1), 15.8 (1) 16.0 (1), 31.4 (2), 14.7 (1)	10 (+2) 0.0 (0), 75.1 (1), 0.0 (0) 33.4 (2), 15.7 (1), 15.2 (1)
Enforcement	0	0.03	0.1	0.33	0.66

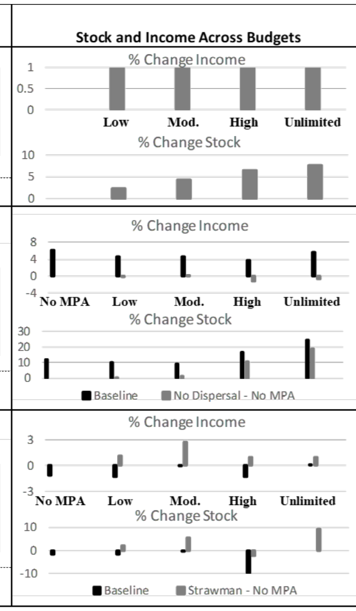

Figure B1. ASL-maximizing manager's optimal MPA placement and enforcement across a range of budgets for both the baseline (fish dispersal) and sedentary fish. Strawman row depicts results when manager places MPA without recognizing dispersal, while fishers respond as if there is dispersal.

Figure B2: Income-max MPA with no dispersal

	No MPA	Budget: Low	Budget: Moderate	Budget: High	Budget: Unlimited
1. Baseline	5 48.0 (4), 31.3 (2), 16.0 (1) 16.1 (1), 32.0 (2), 0.0 (0)	6 (+1) 42.2 (-1), 32.0 (=), 16.0 (=) 16.4 (=), 32.1 (=), 0.0 (=)	6 (+1) 41.4 (-1), 47.7 (+1), 0.0 (-1) 16.9 (=), 16.5 (-1), 15.4 (+1)	6 (+1) 40.4 (-1), 32.7 (=), 16.0 (=) 16.8 (=), 32.3 (=), 0.0 (=)	6 (+1) 40.4 (-1), 32.7 (=), 16.0 (=) 16.8 (=), 32.3 (=), 0.0 (=)
Enforcement	0	0.03	0.06	0.18	0.18
2. No Dispersal	8 29.1 (2), 18.5 (1), 16.1 (1) 18.1 (1), 17.2 (1), 15.3 (1)	8 (=) 29.4 (=), 18.5 (=), 16.1 (=) 18.1 (=), 17.2 (=), 15.3 (=)	8 (=) 30.0 (=), 18.5 (=), 16.1 (=) 18.1 (=), 17.2 (=), 15.3 (=)	8 (=) 30.8 (=), 18.5 (=), 16.1 (=) 18.1 (=), 17.2 (=), 15.3 (=)	8 (=) 30.8 (=), 18.5 (=), 16.1 (=) 18.1 (=), 17.2 (=), 15.3 (=)
Enforcement	0	0.03	0.1	0.28	0.28
3. No Dispersal - Strawman	5 48.0 (4), 31.3 (2), 16.0 (1) 16.1 (1), 32.0 (2), 0.0 (0)	6 (+1) 42.3 (-1), 32.0 (=), 16.0 (=) 16.4 (=), 32.1 (=), 0.0 (=)	6 (+1) 41.5 (-1), 32.3 (=), 16.0 (=) 16.6 (=), 32.2 (=), 0.0 (=)	6 (+1) 28.5 (-2), 46.2 (+1), 15.9 (=) 17.3 (=), 31.9 (=), 0.0 (=)	6 (+1) 30.8 (=), 18.5 (=), 16.1 (=) 18.1 (=), 17.2 (=), 15.3 (=)
Enforcement	0	0.03	0.1	0.28	0.28

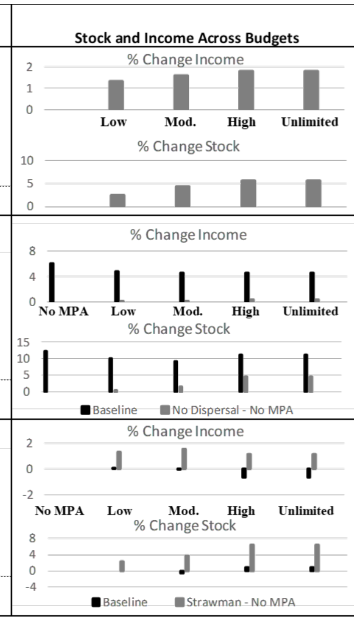

Figure B2. Income-maximizing manager's optimal MPA placement and enforcement across a range of budgets for both the baseline (fish dispersal) and sedentary fish. Strawman row depicts results when manager places MPA without recognizing dispersal, while fishers respond as if there is dispersal.

Homogenous distance costs. With all distance costs at the average distance cost of the baseline case, the homogenous distance cost open access setting supports less fishing with an additional 2 wage-specializers who exit fishing.[2] As compared to the heterogenous distance cost setting, the lack of heterogenous distance costs leads to a more even distribution of fishers and fishing effort, with fishing in all sites – including site 6 which is no longer protected by high distance costs, few fishers near the village due to the higher distance costs there for this setting, and relatively more fishing in the interior column (sites 2 and 5) due to those sites capturing dispersal from neighboring sites (Figure B3). As compared to the heterogenous open access case, the resulting marinescape stocks are higher in the homogenous distance case due to the lower levels of fishing as higher distance costs induce exit, and higher income levels because that lower level of fishing solves some of the open-access over extraction problem. Both ASL and income-maximizing managers cannot leverage distance costs to induce exit or fishing reductions, so they place the MPA in sites to exploit dispersal patterns or reduce fishing in highly fished sites (sites 2 and 4). The ASL-maximizing manager in the homogenous distance cost case tends to site the MPA in a border site (1, 3, 4, or 6) to create dispersal to the interior sites (2 and 5). When this naïve-to-distance cost heterogeneity ASL manager's MPA is implemented in a setting with heterogenous distance costs, the manager is pleasantly surprised by the stock levels generated but generates only 10 to 87% of the gains over open access that the optimal ASL maximizer who recognizes distance cost heterogeneity generates at those budgets (Figure B3). In the baseline,

[2] Using the average distance cost for accessing all sites effectively increases costs to some sites and reduces costs to other sites. The increase in distance costs for high-fished areas leads to a larger reduction in fishing than the increase in fishing in other sites, which generates a lower level of fishing overall. Using a lower level of homogenous distance costs, such as the cost of accessing site 1, leads to more fishing throughout the marinescape and even higher losses for a manager who ignores distance cost heterogeneity in establishing MPAs for a setting in which such heterogeneity exists (Albers et al. 2015).

income-maximizing managers use the specific site of the MPA to create dispersal to neighboring sites and enforcement at levels that induce lower fishing labor, but no fishing exit (Figure B4). The income-maximizing manager never induces exit from fishing because the resulting leakage would reduce incomes. When this manager's MPA is implemented in a setting with heterogenous distance costs, the manager places an MPA in such a way that they lose income relative to open access with heterogenous distance costs (Figure B4). As such they lose approximately 0.5% of the income they could get if they recognized the heterogenous distance costs. For both ASL and income-maximizing managers, and those examining most of the economic modeling of MPAs, the failure to recognize and take advantage of the heterogeneity of distance costs leads to inefficient MPAs that create less conservation of resources and less income than possible with a more accurate description of LMIC fisher costs and decisions.

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B3: ASL-max MPA with homogenous distance

	Budget				
	No MPA	Low	Moderate	High	Unlimited
1. Baseline	5 48.0 (4), 31.3 (2), 16.0 (1) 16.1 (1), 32.0 (2), 0.0 (0)	6 (+1) 42.2 (-1), 32.0 (=), 16.0 (=) 16.4 (=), 32.1 (=), 0.0 (=)	6 (+1) 41.4 (-1), 47.7 (+1), 0.0 (-1) 16.9 (=), 16.5 (-1), 15.4 (+1)	6 (+1) 28.5 (-2), 46.2 (+1), 15.9 (=) 17.3 (=), 31.9 (=), 0.0 (=)	6 (+1) 0.0 (-4), 75.1 (+3), 0.0 (-1) 33.4 (+1), 15.7 (-1), 15.2 (+1)
Enforcement	0	0.03	0.06	0.28	0.41
2. Homogenous Distance	7 17.0 (1), 31.6 (2), 17.0 (1) 17.0 (1), 31.6 (2), 17.0 (1)	7 17.0 (1), 31.3 (2), 17.0 (1) 17.0 (1), 31.7 (2), 17.0 (1)	7 16.5 (1), 31.8 (2), 17.0 (1) 17.1 (1), 31.7 (2), 17.0 (1)	7 17.1 (1), 31.7 (2), 17.0 (1) 16.1 (1), 32.0 (2), 17.0 (1)	7 17.1 (1), 31.7 (2), 17.0 (1) 16.1 (1), 32.0 (2), 17.0 (1)
Enforcement	0	0.03	0.1	0.16	0.16
3. Homogenous Distance - Strawman	5 48.0 (4), 31.3 (2), 16.0 (1) 16.1 (1), 32.0 (2), 0.0 (0)	5 (=) 48.4 (=), 31.0 (=), 16.0 (=) 16.1 (=), 32.1 (=), 0.0 (=)	6 (+1) 41.5 (-1), 32.3 (=), 16.0 (1) 16.6 (=), 32.3 (=), 0.0 (=)	5 (=) 48.8 (=), 31.4 (=), 16.0 (=) 15.6 (=), 32.1 (=), 0.0 (=)	5 (=) 48.8 (=), 31.4 (=), 16.0 (=) 15.6 (=), 32.1 (=), 0.0 (=)
Enforcement	0	0.03	0.1	0.16	0.16

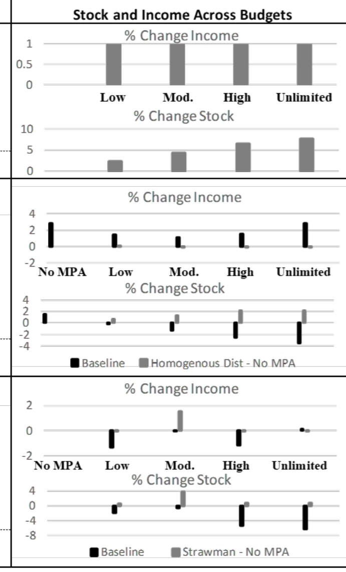

Figure B3. ASL-maximizing manager's optimal MPA placement and enforcement across a range of budgets for both the baseline (heterogenous distance) and homogenous distance. Strawman row depicts results when the manager places the MPA without recognizing heterogenous distance, while fishers respond as if distance is heterogenous.

B4: Income-max MPA with homogenous distance

	Budget				
	No MPA	Low	Moderate	High	Unlimited
1. Baseline	5 48.0 (4), 31.3 (2), 16.0 (1) 16.1 (1), 32.0 (2), 0.0 (0)	6 (+1) 42.2 (-1), 32.0 (=), 16.0 (=) 16.4 (=), 32.1 (=), 0.0 (=)	6 (+1) 41.4 (-1), 47.7 (+1), 0.0 (-1) 16.9 (=), 16.5 (-1), 15.4 (+1)	6 (+1) 40.4 (-1), 32.7 (=), 16.0 (=) 16.8 (=), 32.3 (=), 0.0 (=)	6 (+1) 40.4 (-1), 32.7 (=), 16.0 (=) 16.8 (=), 32.3 (=), 0.0 (=)
Enforcement	0	0.03	0.06	0.18	0.18
2. Homogenous Distance	7 17.0 (1), 31.6 (2), 17.0 (1) 17.0 (1), 31.6 (2), 17.0 (1)	7 17.0 (1), 31.3 (2), 17.0 (1) 17.0 (1), 31.7 (2), 17.0 (1)	7 17.0 (1), 31.3 (2), 17.0 (1) 17.0 (1), 31.7 (2), 17.0 (1)	7 17.0 (1), 31.3 (2), 17.0 (1) 17.0 (1), 31.7 (2), 17.0 (1)	7 17.0 (1), 31.3 (2), 17.0 (1) 17.0 (1), 31.7 (2), 17.0 (1)
Enforcement	0	0.03	0.03	0.03	0.03
3. Homogenous Distance - Strawman	5 48.0 (4), 31.3 (2), 16.0 (1) 16.1 (1), 32.0 (2), 0.0 (0)	5 (=) 48.4 (=), 31.0 (=), 16.0 (=) 16.1 (=), 32.1 (=), 0.0 (=)	5 (=) 48.4 (=), 31.0 (=), 16.0 (=) 16.1 (=), 32.1 (=), 0.0 (=)	5 (=) 48.4 (=), 31.0 (=), 16.0 (=) 16.1 (=), 32.1 (=), 0.0 (=)	5 (=) 48.4 (=), 31.0 (=), 16.0 (=) 16.1 (=), 32.1 (=), 0.0 (=)
Enforcement	0	0.03	0.03	0.03	0.03

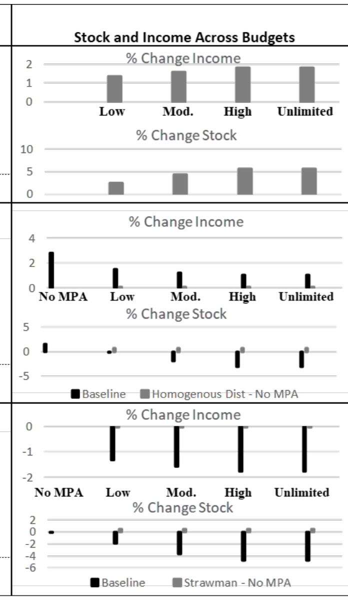

Figure B4. Income-maximizing manager's optimal MPA placement and enforcement across a range of budgets for both the baseline (heterogenous distance) and homogenous distance. Strawman row depicts results when the manager places the MPA without recognizing heterogenous distance, while fishers respond as if distance is heterogenous.

C. Reduced and No Onshore Wage Case

No Wage. When the onshore wage is set to zero and fishers have no economic alternatives to fishing or opportunity costs, fishing effort is largely unaffected by MPAs set by either the income-maximizing or ASL-maximizing manager because villagers face no opportunity cost of time and face only small gas costs as a punishment for fishing in the MPA. At high levels of enforcement, the MPA induces exit of fishers in that site. In the presence of a fine, which drives expected returns from fishing below zero, lower levels of enforcement alter fishing behavior in a setting with no opportunity cost to time.

Low Wage. When onshore wage is smaller than the baseline, more villagers fish, which results in lower marinescape stock. Due to both the increased fishing labor worsening fishing outcomes and the low onshore wages, total income decreases relative to the baseline wage case. In a case where the onshore wage is 17% lower than the baseline, total income in open access is 17% lower and stock is 16% lower than the baseline case. At a reduced wage, the ASL-maximizing manager places the MPA in sites close to the village at low enforcement budgets to reduce fishing effort and then in sites where exit can be induced at low levels of enforcement (Figure C1). Inducing exit from fishing in one site allows for more fishing to be supported in neighboring sites due to dispersal without significantly affecting the steady state stock. The income-maximizing MPA improves incomes and ASL at all levels of enforcement budgets (Figure C2). Unlike the baseline, the ASL-max MPA also improves incomes as well as ASL at all levels of enforcement by correcting open access over-extraction.

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C1: ASL-max and income-max MPA with reduced wage

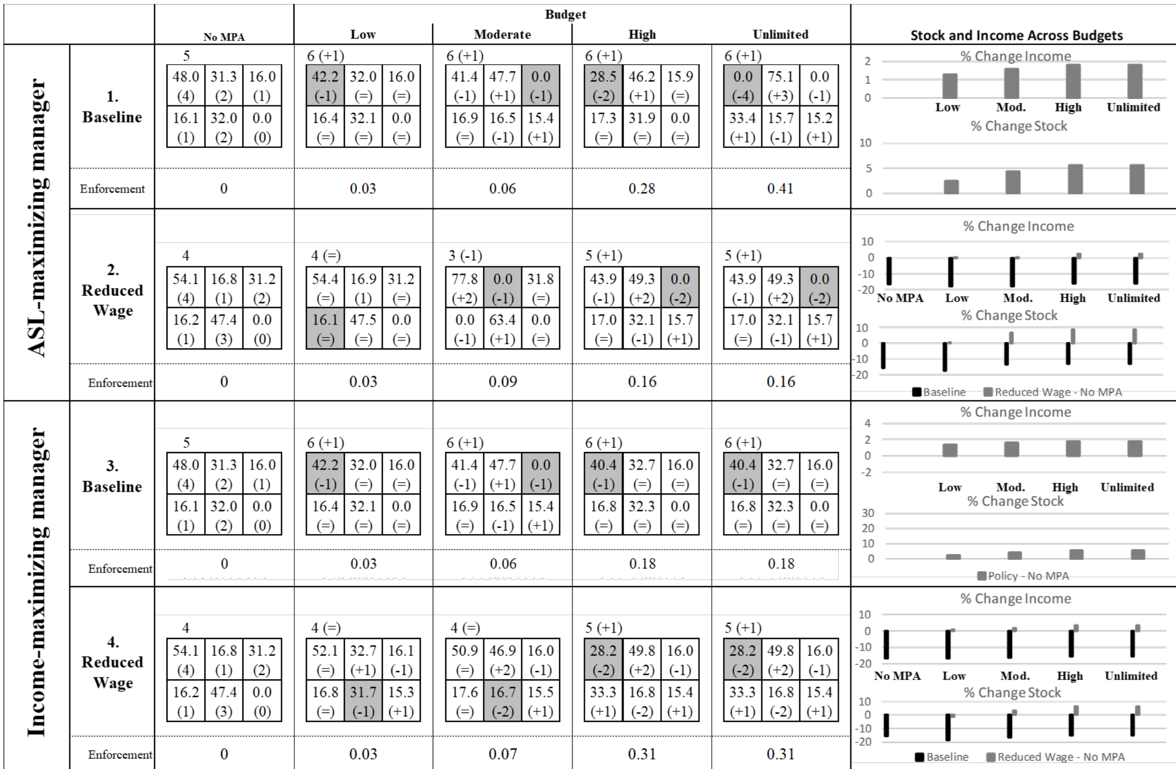

Figure C1. ASL- and income-maximizing manager's optimal MPA placement and enforcement over a range of enforcement budgets for the baseline wage and a reduced wage. The reduced wage is 17% lower than the baseline.

D. Open Access Labor Allocation, Fishing Labor, and Per Site Stock for Border Cases

Figure D1: Closed Border – Open Access Labor Allocations and Stock

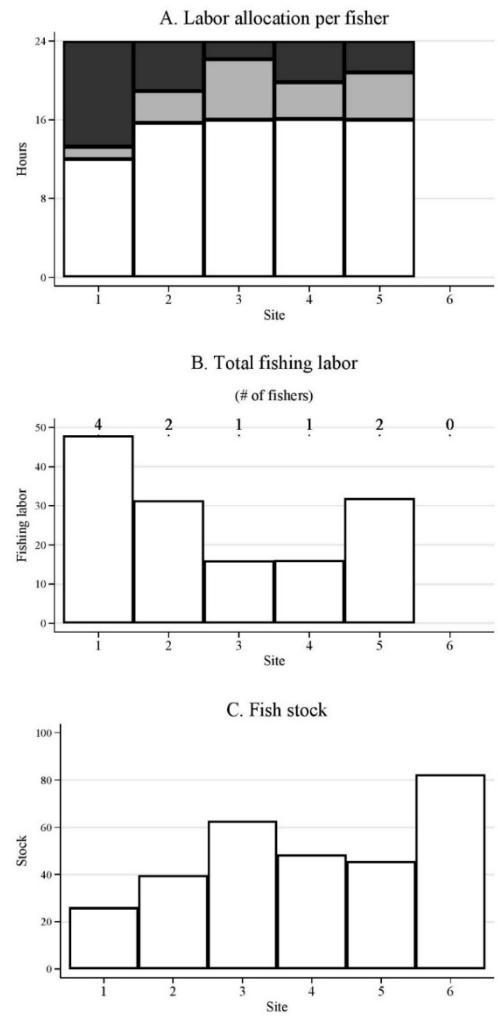

Figure D1. Labor allocation per fisher, total fishing effort, and fish stock per site for the closed border setting. *Panel A* depicts the labor allocation per villager in each site. This graph does not fully reflect the spatial configuration of the setting demonstrated in Figure 1 because it uses the vectorized matrix of sites travel time increases the farther from the village to the fishing site, and it increases monotonically in the first row of the matrix (sites 1, 2, and 3). However, site 4 (row 2, column 1) is closer to the village than site 3 (row 1, column 3), and has a shorter travel time. In sites with no bar indicated in the figure, such as site 6, no one fishes. *Panel B* shows total fishing labor across all villagers per site and the number of villagers in each site (numbers over bars). *Panel C* shows the fish stock in each site.

Figure D2: Open Border High – Open Access Labor Allocations and Stock

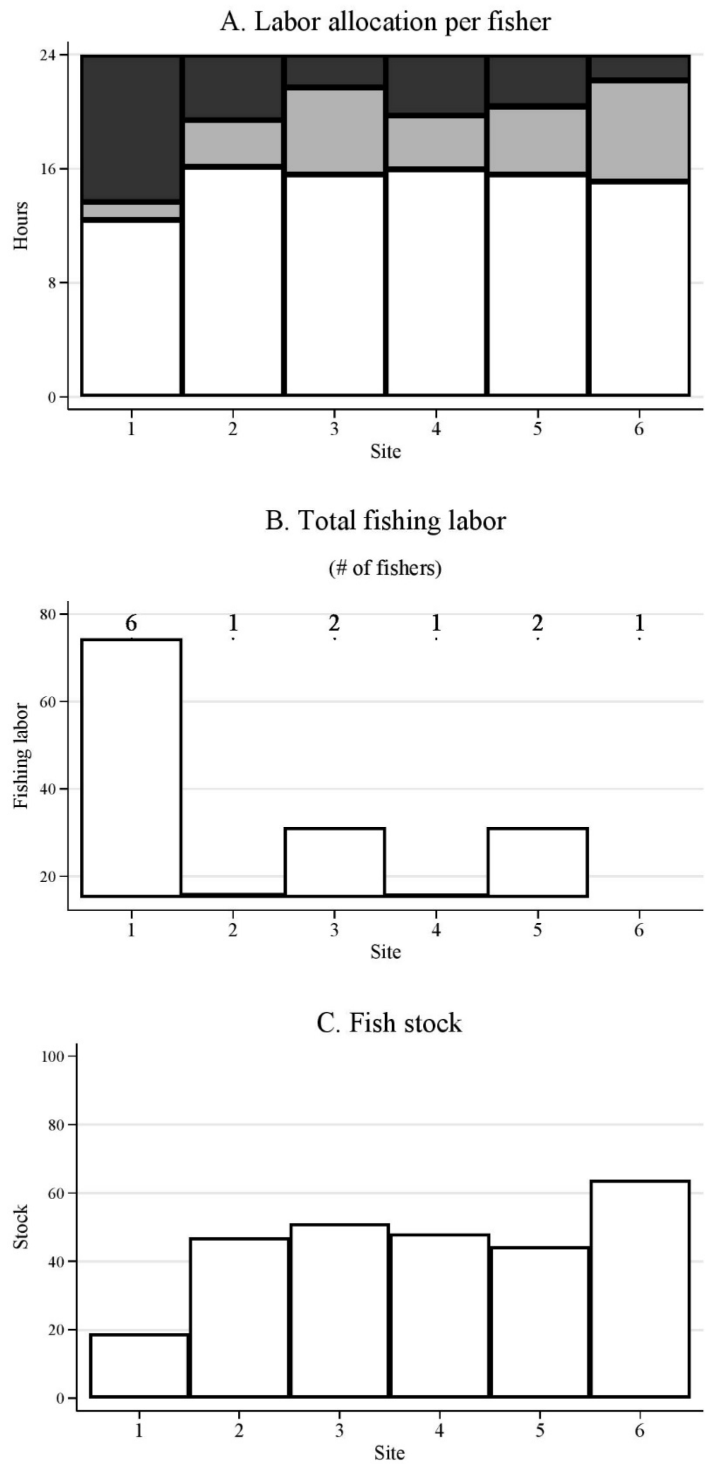

Figure D2. Labor allocation per fisher, total fishing effort, and fish stock per site for the open border, high population outside the marinescape setting.

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Marine Resource Economics 36(4). DOI: https://doi.org/10.1086/715818.

Figure D3: Open Border Low – Open Access Labor Allocations and Stock

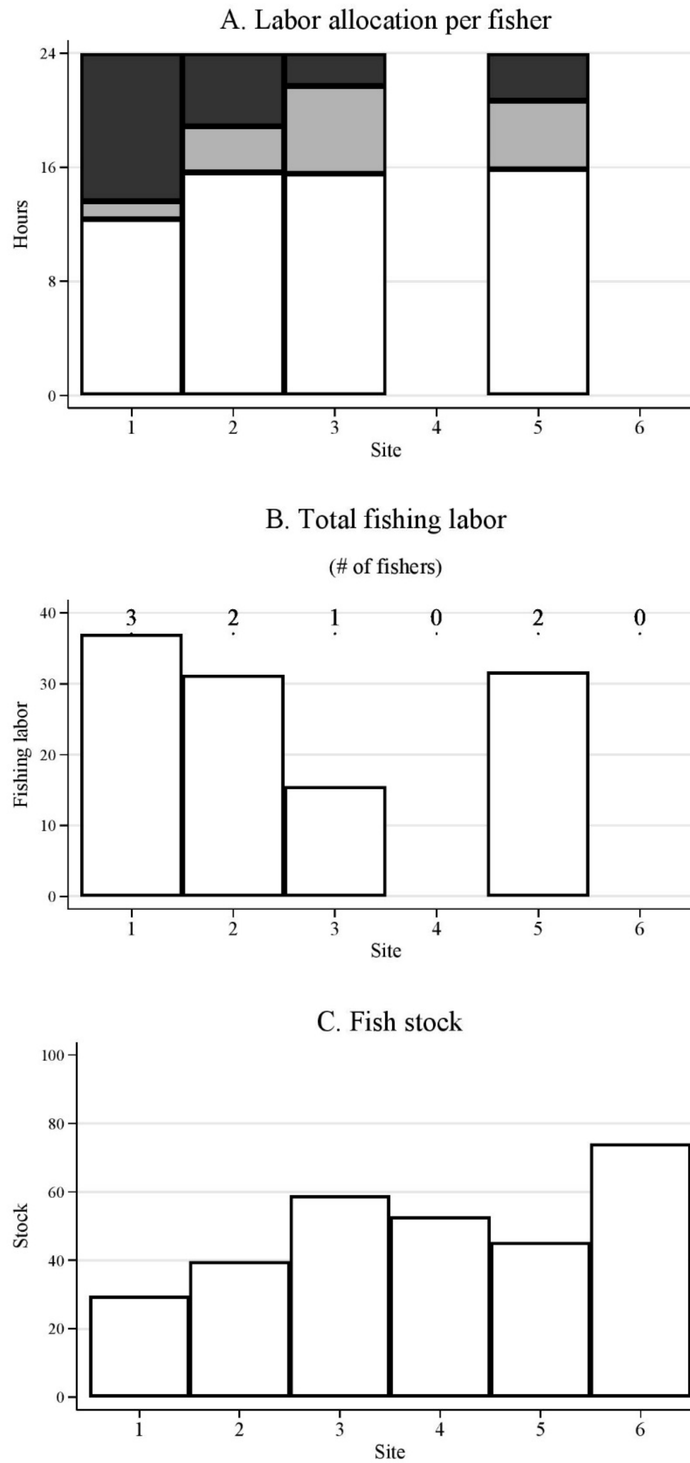

Figure D3. Labor allocation per fisher, total fishing effort, and fish stock per site for the open border, low population outside the marinescape setting.

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Marine Resource Economics 36(4). DOI: https://doi.org/10.1086/715818.

E. Onshore Wage Policies

Figure E1: ASL-max MPAs for different wage levels

	No MPA	Budget: Low	Moderate	High	Unlimited
1. Baseline	5 48.0 (4), 31.3 (2), 16.0 (1); 16.1 (1), 32.0 (2), 0.0 (0)	6 (+1) 42.2 (-1), 32.0 (=), 16.0 (=); 16.4 (=), 32.1 (=), 0.0 (=)	6 (+1) 41.4 (-1), 47.7 (+1), 0.0 (-1); 16.9 (=), 16.5 (-1), 15.4 (+1)	6 (+1) 28.5 (-2), 46.2 (+1), 15.9 (=); 17.3 (=), 31.9 (=), 0.0 (=)	6 (+1) 0.0 (-4), 75.1 (+3), 0.0 (-1); 33.4 (+1), 15.7 (-1), 15.2 (+1)
Enforcement	0	0.03	0.06	0.28	0.41
2. Wage +17%	6 39.1 (3), 29.6 (2), 15.3 (1); 15.4 (1), 30.2 (2), 0.0 (0)	7 (+1) 40.4 (=), 31.3 (=), 15.5 (=); 16.3 (=), 16.3 (-1), 0.0 (=)	7 (+1) 39.3 (=), 47.0 (+1), 0.0 (-1); 17.0 (=), 0.0 (-2), 15.1 (+1)	7 (+1) 12.3 (-2), 61.2 (+2), 0.0 (-1); 32.1 (+1), 0.0 (-2), 15.0 (+1)	7 (+1) 12.3 (-2), 61.2 (+2), 0.0 (-1); 32.1 (+1), 0.0 (-2), 15.0 (+1)
Enforcement	0	0.03	0.1	0.34	0.34
3. Wage +33%	7 49.8 (4), 15.6 (1), 14.9 (1); 0.0 (0), 30.6 (2), 0.0 (0)	8 (+1) 37.5 (-1), 31.4 (+1), 0.0 (-1); 15.4 (+1), 15.9 (-1), 0.0 (=)	8 (+1) 37.5 (-1), 31.4 (+1), 0.0 (-1); 15.4 (+1), 15.9 (-1), 0.0 (=)	9 (+2) 13.3 (-3), 46.3 (+2), 0.0 (-1); 16.8 (+1), 15.8 (-1), 0.0 (=)	9 (+2) 13.3 (-3), 46.3 (+2), 0.0 (-1); 16.8 (+1), 15.8 (-1), 0.0 (=)
Enforcement	0	0.03	0.03	0.32	0.32
4. Wage +50%	8 34.4 (3), 29.3 (2), 0.0 (0); 14.5 (1), 15.1 (1), 0.0 (0)	9 (+1) 39.3 (=), 29.6 (=), 0.0 (=); 0.0 (-1), 15.7 (=), 0.0 (=)	9 (+1) 35.5 (=), 31.0 (=), 0.0 (=); 15.5 (=), 0.0 (-1), 0.0 (=)	10 (+2) 0.0 (-3), 44.6 (+1), 0.0 (=); 16.4 (=), 15.1 (=), 0.0 (=)	10 (+2) 0.0 (-3), 44.6 (+1), 0.0 (=); 16.4 (=), 15.1 (=), 0.0 (=)
Enforcement	0	0.02	0.06	0.33	0.33
5. Wage +67%	10 38.4 (3), 15.6 (1), 0.0 (0); 0.0 (0), 15.3 (1), 0.0 (0)	10 (=) 37.9 (=), 15.6 (1), 0.0 (=); 0.0 (=), 15.3 (=), 0.0 (=)	10 (=) 36.7 (=), 15.8 (=), 0.0 (=); 0.0 (=), 15.3 (=), 0.0 (=)	11 (+1) 12.7 (-2), 31.1 (+1), 0.0 (=); 15.8 (+1), 0.0 (-1), 0.0 (=)	11 (+1) 12.7 (-2), 31.1 (+1), 0.0 (=); 15.8 (+1), 0.0 (-1), 0.0 (=)
Enforcement	0	0.03	0.09	0.25	0.25
6. Wage +83%	10 35.2 (3), 14.6 (1), 0.0 (0); 0.0 (0), 14.4 (1), 0.0 (0)	11 (+1) 36.3 (=), 15.4 (=), 0.0 (=); 0.0 (=), 0.0 (-1), 0.0 (=)	11 (+1) 36.3 (=), 15.4 (=), 0.0 (=); 0.0 (=), 0.0 (-1), 0.0 (=)	12 (+2) 0.0 (-3), 30.1 (+1), 0.0 (=); 15.4 (+1), 0.0 (-1), 0.0 (=)	12 (+2) 0.0 (-3), 30.1 (+1), 0.0 (=); 15.4 (+1), 0.0 (-1), 0.0 (=)
Enforcement	0	0.01	0.01	0.26	0.26

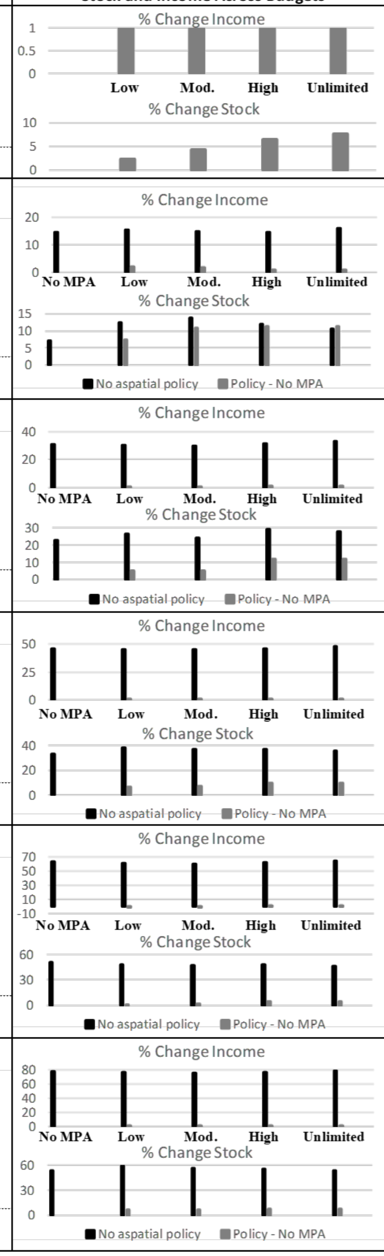

Figure E1. ASL-maximizing manager's optimal MPA placement and enforcement over a range of budgets for different onshore wage levels. Each wage is higher than the baseline by the given percentage.

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Marine Resource Economics 36(4). DOI: https://doi.org/10.1086/715818.

Figure E2: Income-max MPAs for different wage levels

	Budget: No MPA	Low	Moderate	High	Unlimited
1. Baseline	5 48.0 (4) | 31.3 (2) | 16.0 (1) 16.1 (1) | 32.0 (2) | 0.0 (0)	6 (+1) 42.2 (-1) | 32.0 (=) | 16.0 (=) 16.4 (=) | 32.1 (=) | 0.0 (=)	6 (+1) 41.4 (-1) | 47.7 (+1) | 0.0 (-1) 16.9 (=) | 16.5 (-1) | 15.4 (+1)	6 (+1) 40.4 (-1) | 32.7 (=) | 16.0 (=) 16.8 (=) | 32.3 (=) | 0.0 (=)	6 (+1) 40.4 (-1) | 32.7 (=) | 16.0 (=) 16.8 (=) | 32.3 (=) | 0.0 (=)
Enforcement	0	0.03	0.06	0.18	0.18
2. Wage +17%	6 39.1 (3) | 29.6 (2) | 15.3 (1) 15.4 (1) | 30.2 (2) | 0.0 (0)	7 (+1) 40.4 (=) | 31.3 (=) | 15.5 (=) 16.3 (=) | 16.3 (-1) | 0.0 (=)	7 (+1) 40.4 (=) | 31.3 (=) | 15.5 (=) 16.3 (=) | 16.3 (-1) | 0.0 (=)	7 (+1) 40.4 (=) | 31.3 (=) | 15.5 (=) 16.3 (=) | 16.3 (-1) | 0.0 (=)	7 (+1) 40.4 (=) | 31.3 (=) | 15.5 (=) 16.3 (=) | 16.3 (-1) | 0.0 (=)
Enforcement	0	0.03	0.03	0.03	0.03
3. Wage +33%	7 49.8 (4) | 15.6 (1) | 14.9 (1) 0.0 (0) | 30.6 (2) | 0.0 (0)	8 (+1) 40.2 (-1) | 16.2 (=) | 15.1 (=) 15.5 (+1) | 16.1 (-1) | 0.0 (=)	8 (+1) 40.2 (-1) | 16.2 (=) | 15.1 (=) 15.5 (+1) | 16.1 (-1) | 0.0 (=)	9 (+2) 14.2 (-3) | 46.1 (+2) | 0.0 (-1) 16.7 (+1) | 15.8 (-1) | 0.0 (=)	9 (+2) 14.2 (-3) | 46.1 (+2) | 0.0 (-1) 16.7 (+1) | 15.8 (-1) | 0.0 (=)
Enforcement	0	0.03	0.03	0.28	0.28
4. Wage +50%	8 34.4 (3) | 29.3 (2) | 0.0 (0) 14.5 (1) | 15.1 (1) | 0.0 (0)	9 (+1) 39.3 (=) | 29.6 (=) | 0.0 (=) 0.0 (-1) | 15.7 (=) | 0.0 (=)	9 (+1) 39.3 (=) | 29.6 (=) | 0.0 (=) 0.0 (-1) | 15.7 (=) | 0.0 (=)	10 (+2) 0.0 (-3) | 44.6 (+1) | 0.0 (=) 16.4 (=) | 15.1 (=) | 0.0 (=)	10 (+2) 0.0 (-3) | 44.6 (+1) | 0.0 (=) 16.4 (=) | 15.1 (=) | 0.0 (=)
Enforcement	0	0.02	0.02	0.33	0.33
5. Wage +67%	10 38.4 (3) | 15.6 (1) | 0.0 (0) 0.0 (0) | 15.3 (1) | 0.0 (0)	10 (=) 38.4 (=) | 15.6 (=) | 0.0 (=) 0.0 (=) | 15.3 (=) | 0.0 (=)	10 (=) 38.4 (=) | 15.6 (1) | 0.0 (=) 0.0 (=) | 15.3 (=) | 0.0 (=)	11 (+1) 13.7 (-2) | 30.9 (+1) | 0.0 (=) 15.8 (+1) | 0.0 (-1) | 0.0 (=)	11 (+1) 13.7 (-2) | 30.9 (+1) | 0.0 (=) 15.8 (+1) | 0.0 (-1) | 0.0 (=)
Enforcement	0	0	0	0.2	0.2
6. Wage +83%	10 35.2 (3) | 14.6 (1) | 0.0 (0) 0.0 (0) | 14.4 (1) | 0.0 (0)	11 (+1) 36.3 (=) | 15.4 (1) | 0.0 (0) 0.0 (=) | 0.0 (-1) | 0.0 (0)	11 (+1) 38.4 (=) | 0.0 (-1) | 0.0 (=) 0.0 (=) | 15.0 (=) | 0.0 (=)	12 (+2) 0.0 (-3) | 30.1 (+1) | 0.0 (=) 15.4 (+1) | 0.0 (-1) | 0.0 (=)	12 (+2) 0.0 (-3) | 30.1 (+1) | 0.0 (=) 15.4 (+1) | 0.0 (-1) | 0.0 (=)
Enforcement	0	0.01	0.07	0.26	0.26

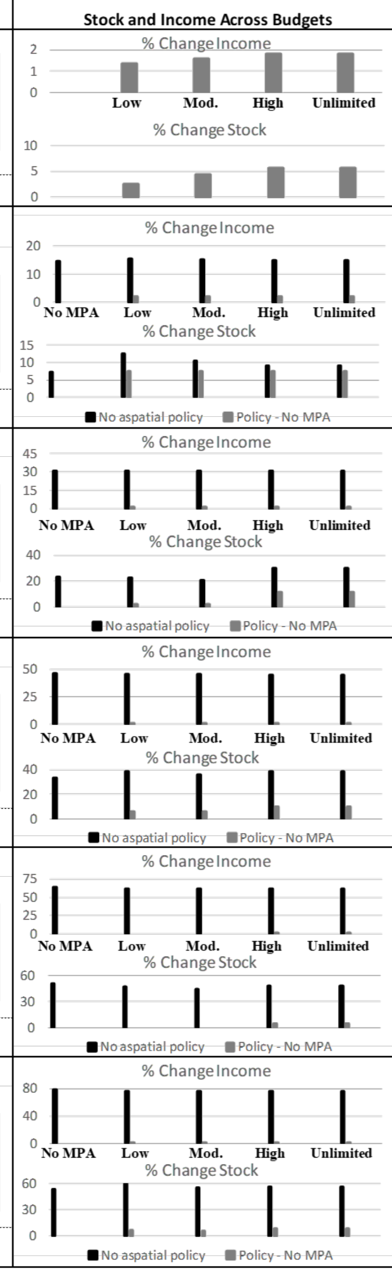

Figure E2. Income-maximizing manager's optimal MPA placement and enforcement over a range of budgets for different onshore wage levels. Each wage is higher than the baseline by the given percentage.

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Marine Resource Economics 36(4). DOI: https://doi.org/10.1086/715818.

Figure E3: Open access labor allocation, fishing effort, and stock for different low wage levels

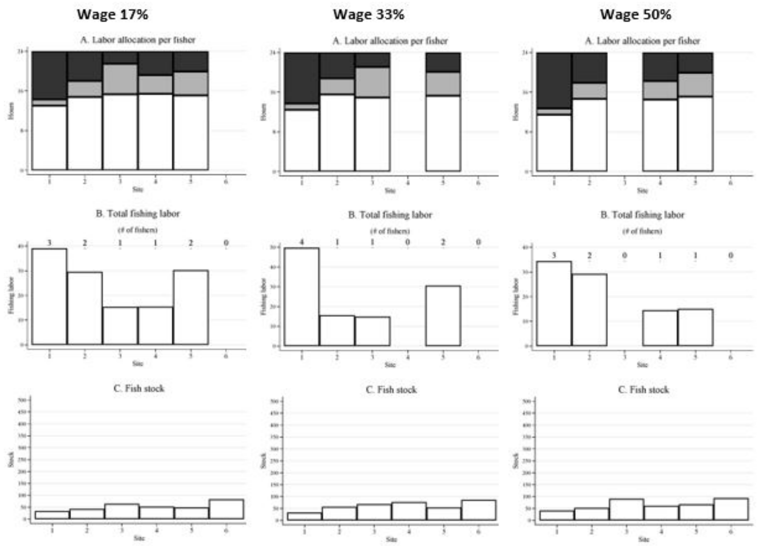

Figure E3: Labor allocation per fisher, total fishing effort, and fish stock per site for 3 onshore wage policy settings.

Figure E4: Open access labor allocation, fishing effort, and stock for different high wage levels

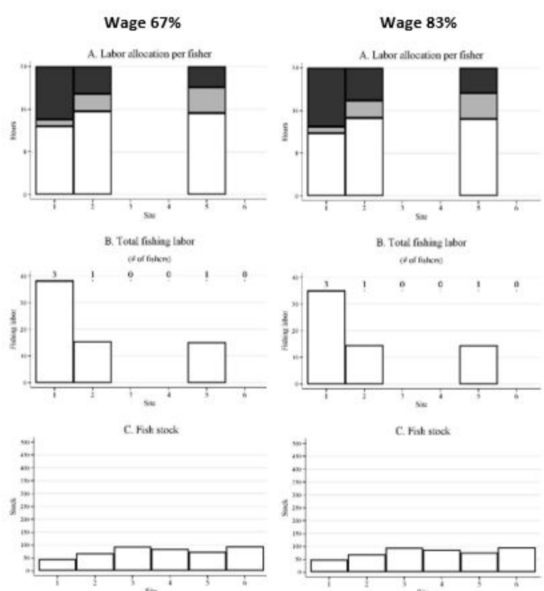

Figure E4: Labor allocation per fisher, total fishing effort, and fish stock per site for 2 onshore wage policy settings.

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Marine Resource Economics 36(4). DOI: https://doi.org/10.1086/715818.

F. Landing Tax Policies

Figure F1: ASL max MPA for different landing tax levels

	No MPA	Budget: Low	Moderate	High	Unlimited
1. Baseline	5 48.0 (4) | 31.3 (2) | 16.0 (1) 16.1 (1) | 32.0 (2) | 0.0 (0)	6 (+1) 42.2 (-1) | 32.0 (=) | 16.0 (=) 16.4 (=) | 32.1 (=) | 0.0 (=)	6 (+1) 41.4 (-1) | 47.7 (+1) | 0.0 (-1) 16.9 (=) | 16.5 (-1) | 15.4 (+1)	6 (+1) 28.5 (-2) | 46.2 (+1) | 15.9 (=) 17.3 (=) | 31.9 (=) | 0.0 (=)	6 (+1) 0.0 (-4) | 75.1 (+3) | 0.0 (-1) 33.4 (+1) | 15.7 (-1) | 15.2 (+1)
Enforcement	0	0.03	0.06	0.28	0.41
2. Landing Tax +10%	6 40.2 (3) | 30.3 (2) | 15.6 (1) 15.7 (1) | 30.9 (2) | 0.0 (0)	6 (=) 49.5 (+1) | 16.6 (-1) | 15.9 (=) 15.5 (=) | 31.7 (=) | 0.0 (=)	7 (+1) 41.7 (=) | 32.2 (=) | 15.7 (=) 16.7 (=) | 16.2 (-1) | 0.0 (=)	7 (+1) 40.5 (=) | 48.1 (+1) | 0.0 (-1) 17.2 (=) | 0.0 (-2) | 15.3 (+1)	7 (+1) 40.5 (=) | 48.1 (+1) | 0.0 (-1) 17.2 (=) | 0.0 (-2) | 15.3 (+1)
Enforcement	0	0.03	0.1	0.11	0.11
3. Landing Tax +20%	7 52.1 (4) | 16.1 (1) | 15.3 (1) 0.0 (0) | 31.5 (2) | 0.0 (0)	8 (+1) 39.2 (-1) | 32.4 (+1) | 0.0 (-1) 15.9 (+1) | 16.3 (-1) | 0.0 (=)	8 (+1) 39.2 (-1) | 32.4 (+1) | 0.0 (-1) 15.9 (+1) | 16.3 (-1) | 0.0 (=)	9 (+2) 14.3 (-3) | 47.9 (+2) | 0.0 (-1) 17.2 (+1) | 16.2 (-1) | 0.0 (=)	9 (+2) 14.3 (-3) | 47.9 (+2) | 0.0 (-1) 17.2 (+1) | 16.2 (-1) | 0.0 (=)
Enforcement	0	0.03	0.03	0.32	0.32
4. Landing Tax +30%	9 40.7 (3) | 30.5 (2) | 0.0 (0) 0.0 (0) | 16.1 (1) | 0.0 (0)	9 (=) 50.0 (+1) | 16.5 (-1) | 0.0 (=) 0.0 (=) | 16.3 (=) | 0.0 (0)	9 (=) 50.5 (+1) | 15.8 (-1) | 0.0 (=) 0.0 (=) | 16.4 (=) | 0.0 (=)	10 (+1) 0.0 (-3) | 47.3 (+1) | 0.0 (=) 30.9 (+2) | 0.0 (-1) | 0.0 (=)	10 (+1) 0.0 (-3) | 47.3 (+1) | 0.0 (=) 30.9 (+2) | 0.0 (-1) | 0.0 (=)
Enforcement	0	0.03	0.1	0.3	0.3
5. Landing Tax +40%	10 38.4 (3) | 15.6 (1) | 0.0 (0) 0.0 (0) | 15.3 (1) | 0.0 (0)	11 (+1) 39.7 (=) | 16.3 (1) | 0.0 (=) 0.0 (=) | 0.0 (-1) | 0.0 (=)	11 (+1) 39.7 (=) | 16.3 (1) | 0.0 (=) 0.0 (=) | 0.0 (-1) | 0.0 (=)	12 (+2) 0.0 (-3) | 32.0 (+1) | 0.0 (=) 16.3 (+1) | 0.0 (-1) | 0.0 (=)	12 (+2) 0.0 (-3) | 32.0 (+1) | 0.0 (=) 16.3 (+1) | 0.0 (-1) | 0.0 (=)
Enforcement	0	0.02	0.02	0.29	0.29

Stock and Income Across Budgets

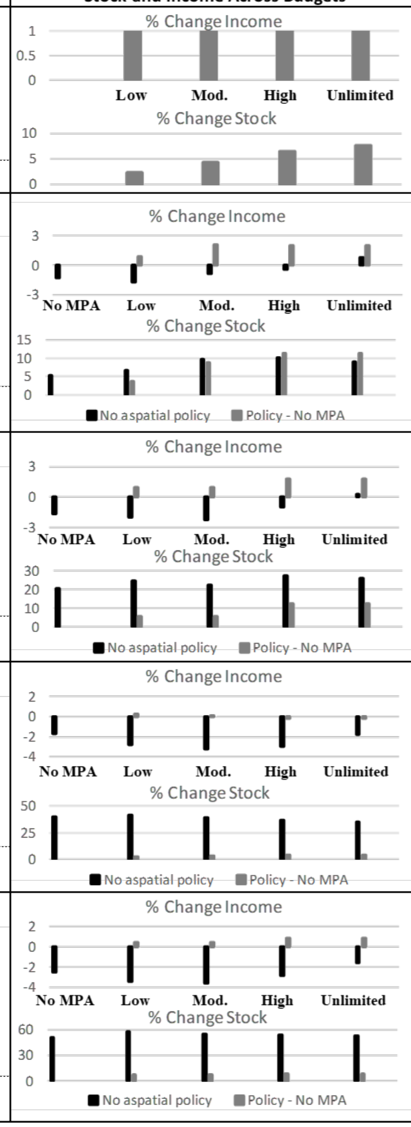

Figure F1. ASL-maximizing manager's optimal MPA placement and enforcement over a range of budgets for different landing tax levels. Each landing tax is higher than the baseline by given percentage.

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Marine Resource Economics 36(4). DOI: https://doi.org/10.1086/715818.

Figure F2: Income max MPA for different landing tax levels

	No MPA	Budget: Low	Moderate	High	Unlimited
1. Baseline	5 48.0 (4) | 31.3 (2) | 16.0 (1) 16.1 (1) | 32.0 (2) | 0.0 (0)	6 (+1) 42.2 (-1) | 32.0 (=) | 16.0 (=) 16.4 (=) | 32.1 (=) | 0.0 (=)	6 (+1) 41.4 (-1) | 47.7 (+1) | 0.0 (-1) 16.9 (=) | 16.5 (-1) | 15.4 (+1)	6 (+1) 40.4 (-1) | 32.7 (=) | 16.0 (=) 16.8 (=) | 32.3 (=) | 0.0 (=)	6 (+1) 40.4 (-1) | 32.7 (=) | 16.0 (=) 16.8 (=) | 32.3 (=) | 0.0 (=)
Enforcement	0	0.03	0.06	0.18	0.18
2. Landing Tax +10%	6 40.2 (3) | 30.3 (2) | 15.6 (1) 15.7 (1) | 30.9 (2) | 0.0 (0)	6 (=) 49.5 (+1) | 16.6 (-1) | 15.9 (=) 15.5 (=) | 31.7 (=) | 0.0 (0)	7 (+1) 41.6 (=) | 32.1 (=) | 15.7 (=) 16.7 (=) | 16.5 (-1) | 0.0 (=)	7 (+1) 41.6 (=) | 32.1 (=) | 15.7 (=) 16.7 (=) | 16.5 (-1) | 0.0 (=)	7 (+1) 41.6 (=) | 32.1 (=) | 15.7 (=) 16.7 (=) | 16.5 (-1) | 0.0 (=)
Enforcement	0	0.03	0.05	0.05	0.05
3. Landing Tax +20%	7 52.1 (4) | 16.1 (1) | 15.3 (1) 0.0 (0) | 31.5 (2) | 0.0 (0)	8 (+1) 39.2 (-1) | 32.4 (+1) | 0.0 (-1) 15.9 (+1) | 16.3 (-1) | 0.0 (=)	8 (+1) 42.0 (-1) | 16.6 (=) | 15.5 (=) 16.0 (-1) | 16.5 (-1) | 0.0 (=)	9 (+2) 14.7 (-3) | 47.8 (+2) | 0.0 (-1) 17.1 (+1) | 16.2 (-1) | 0.0 (=)	9 (+2) 14.7 (-3) | 47.8 (+2) | 0.0 (-1) 17.1 (+1) | 16.2 (-1) | 0.0 (=)
Enforcement	0	0.03	0.04	0.3	0.3
4. Landing Tax +30%	9 40.7 (3) | 30.5 (2) | 0.0 (0) 0.0 (0) | 16.1 (1) | 0.0 (0)	9 (=) 50.0 (+1) | 16.5 (-1) | 0.0 (=) 0.0 (=) | 16.3 (=) | 0.0 (=)	9 (=) 50.0 (+1) | 16.5 (-1) | 0.0 (=) 0.0 (=) | 16.3 (=) | 0.0 (=)	10 (+1) 14.7 (-2) | 32.5 (=) | 0.0 (=) 16.3 (+1) | 15.7 (=) | 0.0 (=)	10 (+1) 14.7 (-2) | 32.5 (=) | 0.0 (=) 16.3 (+1) | 15.7 (=) | 0.0 (=)
Enforcement	0	0.03	0.03	0.25	0.25
5. Landing Tax +40%	10 38.4 (3) | 15.6 (1) | 0.0 (0) 0.0 (0) | 15.3 (1) | 0.0 (0)	11 (+1) 39.7 (=) | 16.3 (1) | 0.0 (=) 0.0 (=) | 0.0 (-1) | 0.0 (=)	11 (+1) 39.7 (=) | 16.3 (1) | 0.0 (=) 0.0 (=) | 0.0 (-1) | 0.0 (=)	12 (+2) 0.0 (-3) | 32.0 (+1) | 0.0 (=) 16.3 (+1) | 0.0 (-1) | 0.0 (=)	12 (+2) 0.0 (-3) | 32.0 (+1) | 0.0 (=) 16.3 (+1) | 0.0 (-1) | 0.0 (=)
Enforcement	0	0.02	0.02	0.29	0.29

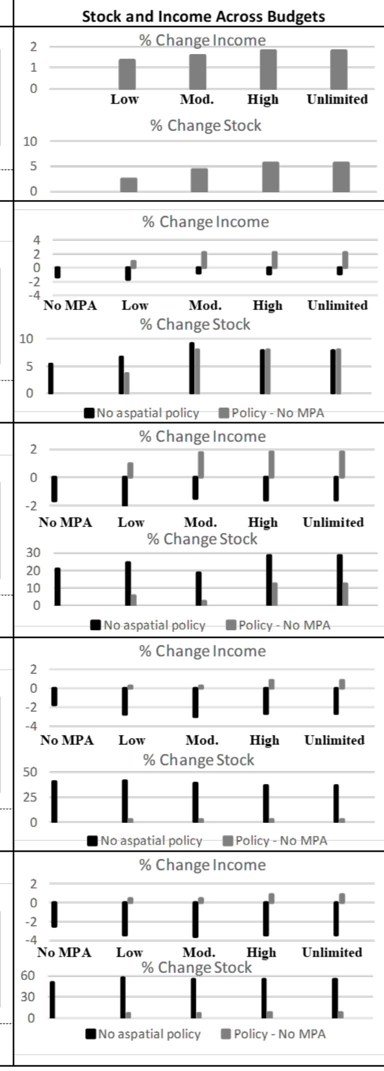

Figure F2. Income-maximizing manager's optimal MPA placement and enforcement over a range of budgets for different landing tax levels. Each landing tax is higher than the baseline by given percentage.

Figure F3: Open access labor allocation, fishing effort, and stock for different landing tax levels

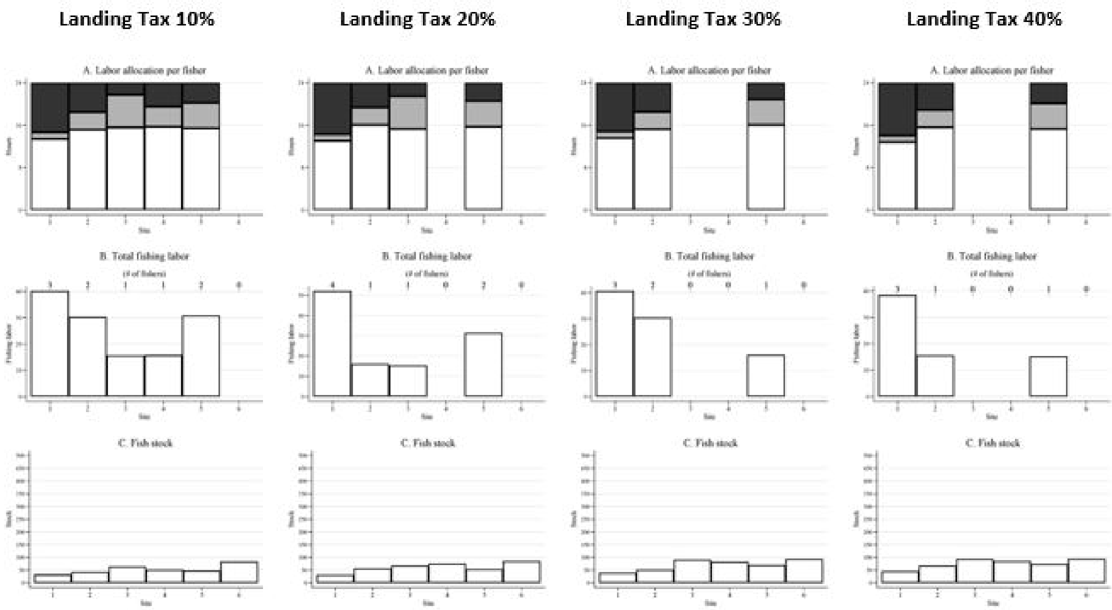

Figure F3: Labor allocation per fisher, total fishing effort, and fish stock per site for different landing tax levels.

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Marine Resource Economics 36(4). DOI: https://doi.org/10.1086/715818.

G. Gas Tax Policies

Figure G1: ASL max MPA for different gas tax levels

	Budget: No MPA	Low	Moderate	High	Unlimited
1. Baseline	5 48.0 (4), 31.3 (2), 16.0 (1) 16.1 (1), 32.0 (2), 0.0 (0)	6 (+1) 42.2 (-1), 32.0 (=), 16.0 (=) 16.4 (=), 32.1 (=), 0.0 (=)	6 (+1) 41.4 (-1), 47.7 (+1), 0.0 (-1) 16.9 (=), 16.5 (-1), 15.4 (+1)	6 (+1) 28.5 (-2), 46.2 (+1), 15.9 (=) 17.3 (=), 31.9 (=), 0.0 (=)	6 (+1) 0.0 (-4), 75.1 (+3), 0.0 (-1) 33.4 (+1), 15.7 (-1), 15.2 (+1)
Enforcement	0	0.03	0.06	0.28	0.41
2. Gas Tax +100%	7 59.9 (4), 17.5 (1), 16.3 (1) 0.0 (0), 33.9 (2), 0.0 (0)	7 (=) 60.1 (=), 17.6 (=), 16.3 (=) 0.0 (=), 33.7 (=), 0.0 (=)	7 (=) 57.2 (=), 34.1 (+1), 0.0 (-1) 0.0 (=), 33.7 (=), 0.0 (=)	7 (=) 72.5 (+1), 0.0 (-1), 16.5 (=) 0.0 (=), 34.5 (=), 0.0 (=)	8 (+1) 0.0 (-4), 66.6 (+3), 0.0 (-1) 34.0 (+2), 16.8 (-1), 0.0 (=)
Enforcement	0	0.03	0.04	0.15	0.37
3. Gas Tax +200%	8 44.9 (3), 35.4 (2), 0.0 (0) 17.3 (1), 17.4 (1), 0.0 (0)	9 (+1) 50.6 (=), 35.7 (=), 0.0 (=) 0.0 (-1), 17.7 (=), 0.0 (=)	9 (+1) 50.6 (=), 35.7 (=), 0.0 (=) 0.0 (-1), 17.7 (=), 0.0 (=)	9 (+1) 50.6 (=), 35.7 (=), 0.0 (=) 0.0 (-1), 17.7 (=), 0.0 (=)	9 (+1) 0.0 (-3), 69.0 (+2), 0.0 (=) 35.3 (+1), 0.0 (-1), 0.0 (=)
Enforcement	0	0.01	0.01	0.01	0.37
4. Gas Tax +300%	9 63.4 (4), 18.8 (1), 0.0 (0) 0.0 (0), 17.9 (1), 0.0 (0)	10 (+1) 35.8 (-2), 37.0 (+1), 0.0 (=) 18.3 (+1), 0.0 (-1), 0.0 (=)	10 (+1) 35.2 (+2), 37.1 (+1), 0.0 (=) 18.4 (+1), 0.0 (-1), 0.0 (=)	10 (+1) 68.3 (=), 0.0 (-1), 0.0 (=) 0.0 (=), 18.1 (=), 0.0 (=)	11 (+2) 0.0 (-4), 55.3 (+2), 0.0 (=) 18.9 (+1), 0.0 (-1), 0.0 (=)
Enforcement	0	0.03	0.1	0.18	0.42
5. Gas Tax +400%	10 53.3 (3), 18.9 (1), 0.0 (0) 0.0 (0), 17.9 (1), 0.0 (0)	10 (=) 52.1 (=), 36.8 (+1), 0.0 (=) 0.0 (=), 0.0 (-1), 0.0 (=)	10 (=) 52.1 (=), 36.8 (+1), 0.0 (=) 0.0 (=), 0.0 (-1), 0.0 (=)	11 (+1) 17.9 (-2), 37.9 (+1), 0.0 (=) 18.8 (+1), 0.0 (-1), 0.0 (=)	11 (+1) 17.0 (-2), 38.0 (+1), 0.0 (=) 18.8 (+1), 0.0 (-1), 0.0 (=)
Enforcement	0	0.02	0.02	0.34	0.4

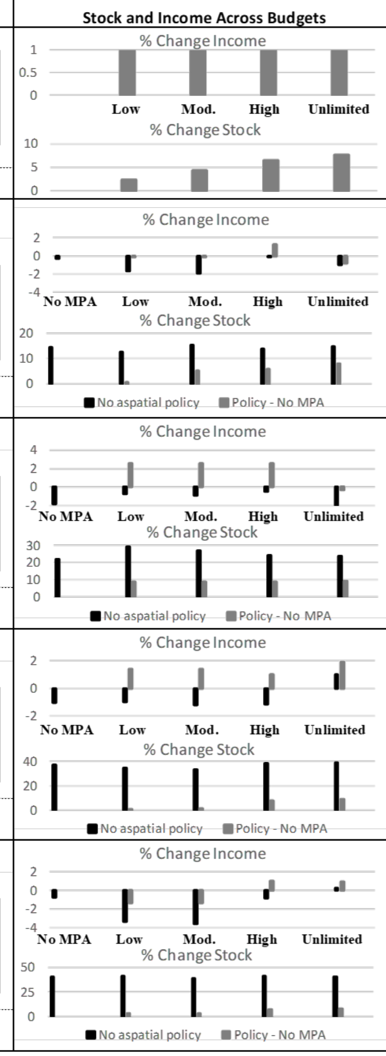

Figure G1. ASL-maximizing manager's optimal MPA placement and enforcement over a range of budgets for different gas tax levels. Each gas tax is higher than the baseline by given percentage.

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Marine Resource Economics 36(4). DOI: https://doi.org/10.1086/715818.

Figure G2: Income max MPA for different gas tax levels

	No MPA	Budget: Low	Budget: Moderate	Budget: High	Budget: Unlimited
1. Baseline	5 48.0 (4) | 31.3 (2) | 16.0 (1) 16.1 (1) | 32.0 (2) | 0.0 (0)	6 (+1) 42.2 (-1) | 32.0 (=) | 16.0 (=) 16.4 (=) | 32.1 (=) | 0.0 (=)	6 (+1) 41.4 (-1) | 47.7 (+1) | 0.0 (-1) 16.9 (=) | 16.5 (-1) | 15.4 (+1)	6 (+1) 40.4 (-1) | 32.7 (=) | 16.0 (=) 16.8 (=) | 32.3 (=) | 0.0 (=)	6 (+1) 40.4 (-1) | 32.7 (=) | 16.0 (=) 16.8 (=) | 32.3 (=) | 0.0 (=)
Enforcement	0	0.03	0.06	0.18	0.18
2. Gas Tax +100%	7 59.9 (4) | 17.5 (1) | 16.3 (1) 0.0 (0) | 33.9 (2) | 0.0 (0)	7 (=) 59.7 (=) | 17.6 (=) | 16.3 (=) 0.0 (=) | 33.9 (=) | 0.0 (=)	7 (=) 60.2 (=) | 17.2 (=) | 16.3 (1) 0.0 (=) | 33.9 (=) | 0.0 (=)	8 (+1) 31.7 (-2) | 35.0 (+1) | 16.2 (=) 17.9 (+1) | 17.3 (-1) | 0.0 (=)	8 (+1) 31.7 (-2) | 35.0 (+1) | 16.2 (=) 17.9 (+1) | 17.3 (-1) | 0.0 (=)
Enforcement	0	0.03	0.05	0.25	0.25
3. Gas Tax +200%	8 44.9 (3) | 35.4 (2) | 0.0 (0) 17.3 (1) | 17.4 (1) | 0.0 (0)	9 (+1) 50.6 (=) | 35.7 (=) | 0.0 (=) 0.0 (-1) | 17.7 (=) | 0.0 (=)	9 (+1) 50.6 (=) | 35.7 (=) | 0.0 (=) 0.0 (-1) | 17.7 (=) | 0.0 (=)	9 (+1) 31.7 (-1) | 36.5 (=) | 0.0 (=) 18.0 (=) | 17.5 (=) | 0.0 (=)	9 (+1) 31.7 (-1) | 36.5 (=) | 0.0 (=) 18.0 (=) | 17.5 (=) | 0.0 (=)
Enforcement	0	0.01	0.01	0.28	0.28
4. Gas Tax +300%	9 63.4 (4) | 18.8 (1) | 0.0 (0) 0.0 (0) | 17.9 (1) | 0.0 (0)	10 (+1) 35.8 (-2) | 37.0 (+1) | 0.0 (=) 18.3 (+1) | 0.0 (-1) | 0.0 (=)	10 (+1) 35.2 (-2) | 37.1 (+1) | 0.0 (=) 18.4 (+1) | 0.0 (-1) | 0.0 (=)	10 (+1) 35.2 (-2) | 37.1 (+1) | 0.0 (=) 18.4 (+1) | 0.0 (-1) | 0.0 (=)	11 (+2) 0.0 (-4) | 55.3 (+2) | 0.0 (=) 18.9 (+1) | 0.0 (-1) | 0.0 (=)
Enforcement	0	0.03	0.1	0.1	0.42
5. Gas Tax +400%	10 53.3 (3) | 18.9 (1) | 0.0 (0) 0.0 (0) | 17.9 (1) | 0.0 (0)	10 (=) 53.3 (=) | 18.9 (=) | 0.0 (=) 0.0 (=) | 17.9 (=) | 0.0 (=)	10 (=) 53.3 (=) | 18.9 (=) | 0.0 (=) 0.0 (=) | 17.9 (=) | 0.0 (=)	11 (+1) 18.8 (-2) | 37.8 (+1) | 0.0 (=) 18.7 (+1) | 0.0 (-1) | 0.0 (=)	11 (+1) 18.8 (-2) | 37.8 (+1) | 0.0 (=) 18.7 (+1) | 0.0 (-1) | 0.0 (=)
Enforcement	0	0	0	0.26	0.26

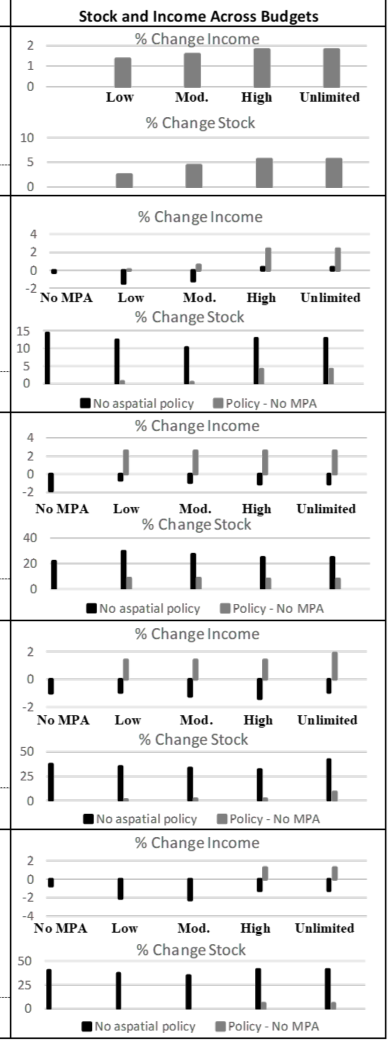

Figure G2. Income-maximizing manager's optimal MPA placement and enforcement over a range of budgets for different gas tax levels. Each gas tax is higher than the baseline by given percentage.

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Marine Resource Economics 36(4). DOI: https://doi.org/10.1086/715818.

Figure G3: Open access labor allocation, fishing effort, and stock for different gas tax levels

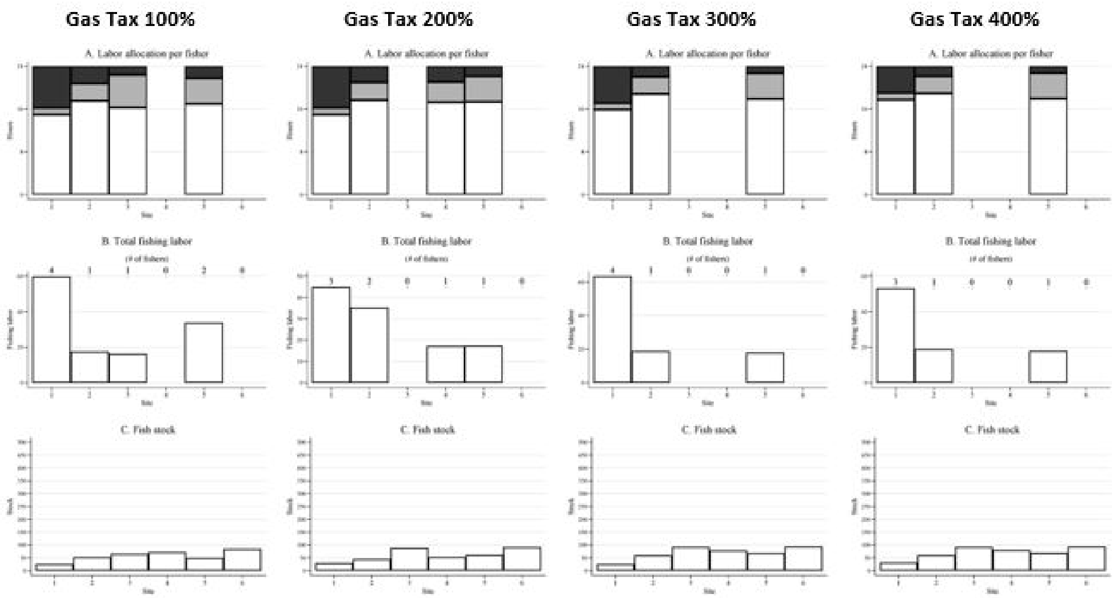

Figure G3: Labor allocation per fisher, total fishing effort, and fish stock per site for different gas tax levels.

Supplemental Material (not copyedited or formatted) for: Heidi Albers, Madison Ashworth, Tabaré Capitán, Róger Madrigal-Ballestero, Louis Preonas. 2021. "MPAs and Aspatial Policies in Artisanal Fisheries."
Marine Resource Economics 36(4). DOI: https://doi.org/10.1086/715818.

H. License Policies

Figure H1: ASL max MPAs for different license levels

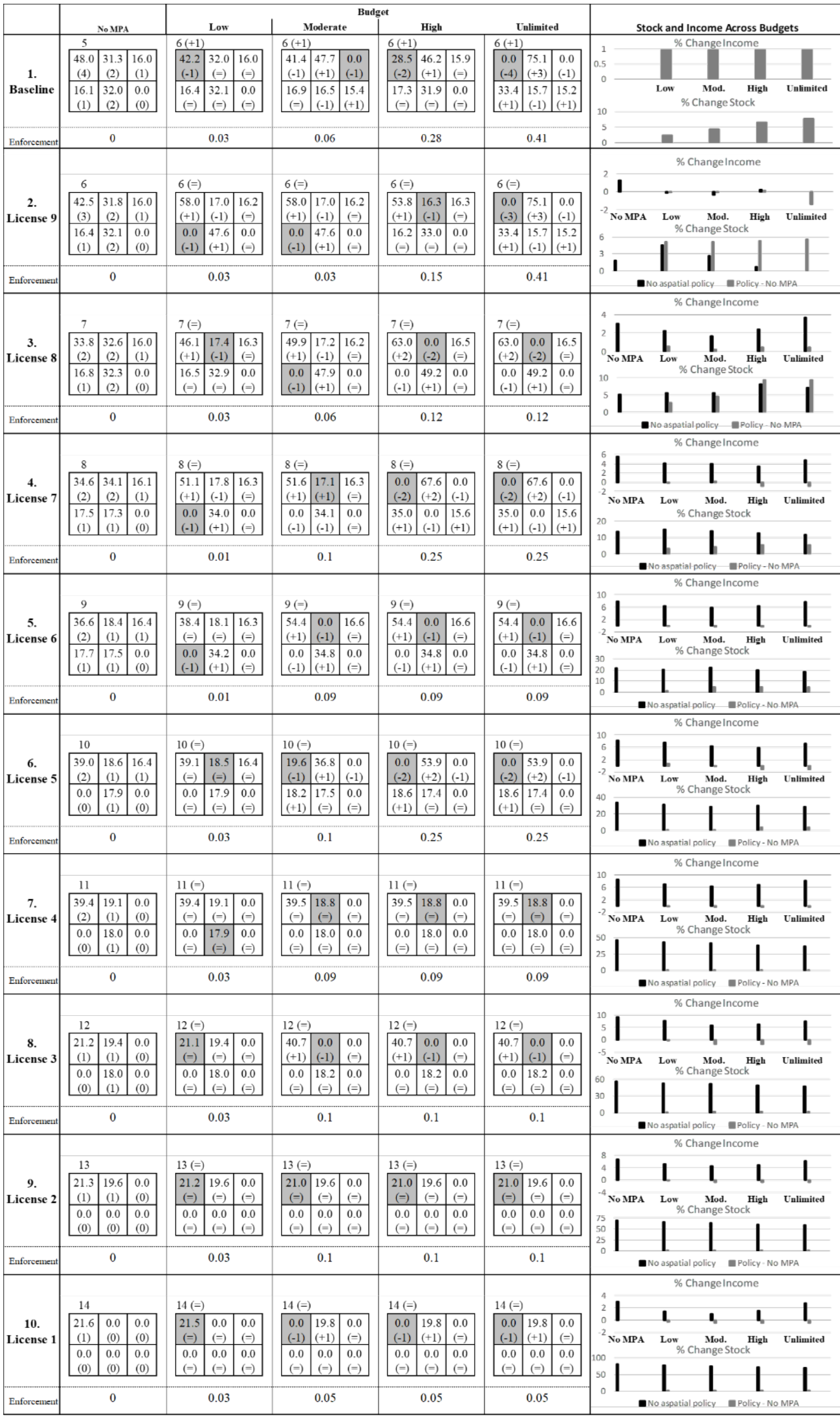

Figure H1. ASL-maximizing manager's optimal MPA placement and enforcement over a range of budgets for different license levels. Note: the income-maximizing license level is 3 licenses.

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Marine Resource Economics 36(4). DOI: https://doi.org/10.1086/715818.

Figure H2: Income max MPAs for different license levels

	No MPA	Budget: Low	Budget: Moderate	Budget: High	Budget: Unlimited
1. Baseline	5 48.0 (4), 31.3 (2), 16.0 (1) 16.1 (1), 32.0 (2), 0.0 (0)	6 (+1) 42.2 (-1), 32.0 (=), 16.0 (=) 16.4 (=), 32.1 (=), 0.0 (=)	6 (+1) 41.4 (-1), 47.7 (+1), 0.0 (-1) 16.9 (=), 16.5 (-1), 15.4 (+1)	6 (+1) 40.4 (-1), 32.7 (=), 16.0 (=) 16.8 (=), 32.3 (=), 0.0 (=)	6 (+1) 40.4 (-1), 32.7 (=), 16.0 (=) 16.8 (=), 32.3 (=), 0.0 (=)
Enforcement	0	0.03	0.06	0.18	0.18
2. License 9	6 42.5 (3), 31.8 (2), 16.0 (1) 16.4 (1), 32.1 (2), 0.0 (0)	6 (=1) 43.5 (=), 32.6 (=), 15.5 (=) 17.0 (=), 16.4 (-1), 15.0 (+1)	6 (=) 53.2 (+1), 16.8 (-1), 16.3 (=) 16.2 (=), 32.9 (=), 0.0 (=)	6 (=) 53.2 (+1), 16.8 (-1), 16.3 (=) 16.2 (=), 32.9 (=), 0.0 (=)	6 (=) 53.2 (+1), 16.8 (-1), 16.3 (=) 16.2 (=), 32.9 (=), 0.0 (=)
Enforcement	0	0.03	0.09	0.09	0.09
3. License 8	7 33.8 (2), 32.6 (2), 16.0 (1) 16.8 (1), 32.3 (2), 0.0 (0)	7 (=) 46.1 (+1), 17.5 (-1), 16.3 (=) 16.5 (=), 32.9 (=), 0.0 (=)	7 (=) 46.1 (+1), 17.5 (-1), 16.3 (=) 16.5 (=), 32.9 (=), 0.0 (=)	7 (=) 46.1 (+1), 17.5 (-1), 16.3 (=) 16.5 (=), 32.9 (=), 0.0 (=)	7 (=) 46.1 (+1), 17.5 (-1), 16.3 (=) 16.5 (=), 32.9 (=), 0.0 (=)
Enforcement	0	0.02	0.02	0.02	0.02
4. License 7	8 34.6 (2), 34.1 (2), 16.1 (1) 17.5 (1), 17.3 (1), 0.0 (0)	8 (=) 51.1 (+1), 17.8 (-1), 16.3 (=) 0.0 (-1), 34.0 (+1), 0.0 (=)	8 (=) 51.1 (+1), 17.8 (-1), 16.3 (=) 0.0 (-1), 34.0 (+1), 0.0 (=)	8 (=) 51.1 (+1), 17.8 (-1), 16.3 (=) 0.0 (-1), 34.0 (+1), 0.0 (=)	8 (=) 51.1 (+1), 17.8 (-1), 16.3 (=) 0.0 (-1), 34.0 (+1), 0.0 (=)
Enforcement	0	0.02	0.02	0.02	0.02
5. License 6	9 36.6 (2), 18.4 (1), 16.4 (1) 17.7 (1), 17.5 (1), 0.0 (0)	9 (=) 20.0 (-1), 36.2 (+1), 0.0 (-1) 18.0 (=), 17.0 (=), 15.5 (+1)	9 (=) 20.0 (-1), 36.2 (+1), 0.0 (-1) 18.0 (=), 17.0 (=), 15.5 (+1)	9 (=) 20.0 (-1), 36.2 (+1), 0.0 (-1) 18.0 (=), 17.0 (=), 15.5 (+1)	9 (=) 20.0 (-1), 36.2 (+1), 0.0 (-1) 18.0 (=), 17.0 (=), 15.5 (+1)
Enforcement	0	0.03	0.03	0.03	0.03
6. License 5	10 39.0 (2), 18.6 (1), 16.4 (1) 0.0 (0), 17.9 (1), 0.0 (0)	10 (=) 39.1 (=), 18.5 (=), 16.4 (=) 0.0 (=), 17.9 (=), 0.0 (=)	10 (=) 20.2 (-1), 37.2 (+1), 0.0 (-1) 18.5 (+1), 0.0 (-1), 15.7 (+1)	10 (=) 20.2 (-1), 37.2 (+1), 0.0 (-1) 18.5 (+1), 0.0 (-1), 15.7 (+1)	10 (=) 20.2 (-1), 37.2 (+1), 0.0 (-1) 18.5 (+1), 0.0 (-1), 15.7 (+1)
Enforcement	0	0.02	0.05	0.05	0.05
7. License 4	11 39.4 (2), 19.1 (1), 0.0 (0) 0.0 (0), 18.0 (1), 0.0 (0)	11 (=) 20.6 (-1), 19.3 (=), 0.0 (=) 18.3 (+1), 17.8 (=), 0.0 (=)	11 (=) 40.4 (=), 0.0 (-1), 16.7 (+1) 0.0 (=), 18.1 (=), 0.0 (=)	11 (=) 40.4 (=), 0.0 (-1), 16.7 (+1) 0.0 (=), 18.1 (=), 0.0 (=)	11 (=) 40.4 (=), 0.0 (-1), 16.7 (+1) 0.0 (=), 18.1 (=), 0.0 (=)
Enforcement	0	0.02	0.1	0.1	0.1
8. License 3	12 21.2 (1), 19.4 (1), 0.0 (0) 0.0 (0), 18.0 (1), 0.0 (0)	12 (=) 21.2 (=), 19.4 (=), 0.0 (=) 0.0 (=), 18.0 (=), 0.0 (=)	12 (=) 21.2 (=), 19.4 (=), 0.0 (=) 0.0 (=), 18.0 (=), 0.0 (=)	12 (=) 21.2 (=), 19.4 (=), 0.0 (=) 0.0 (=), 18.0 (=), 0.0 (=)	12 (=) 21.2 (=), 19.4 (=), 0.0 (=) 0.0 (=), 18.0 (=), 0.0 (=)
Enforcement	0	0	0	0	0
9. License 2	13 21.3 (1), 19.6 (1), 0.0 (0) 0.0 (0), 0.0 (0), 0.0 (0)	13 (=) 21.3 (=), 19.6 (=), 0.0 (=) 0.0 (=), 0.0 (=), 0.0 (=)	13 (=) 21.5 (=), 0.0 (-1), 0.0 (=) 0.0 (=), 18.2 (+1), 0.0 (=)	13 (=) 21.5 (=), 0.0 (-1), 0.0 (=) 0.0 (=), 18.2 (+1), 0.0 (=)	13 (=) 21.5 (=), 0.0 (-1), 0.0 (=) 0.0 (=), 18.2 (+1), 0.0 (=)
Enforcement	0	0	0.05	0.05	0.05
10. License 1	14 21.6 (1), 0.0 (0), 0.0 (0) 0.0 (0), 0.0 (0), 0.0 (0)	14 (=) 21.6 (=), 0.0 (=), 0.0 (=) 0.0 (=), 0.0 (=), 0.0 (=)	14 (=) 21.6 (=), 0.0 (=), 0.0 (=) 0.0 (=), 0.0 (=), 0.0 (=)	14 (=) 21.6 (=), 0.0 (=), 0.0 (=) 0.0 (=), 0.0 (=), 0.0 (=)	14 (=) 21.6 (=), 0.0 (=), 0.0 (=) 0.0 (=), 0.0 (=), 0.0 (=)
Enforcement	0	0	0	0	0

Stock and Income Across Budgets

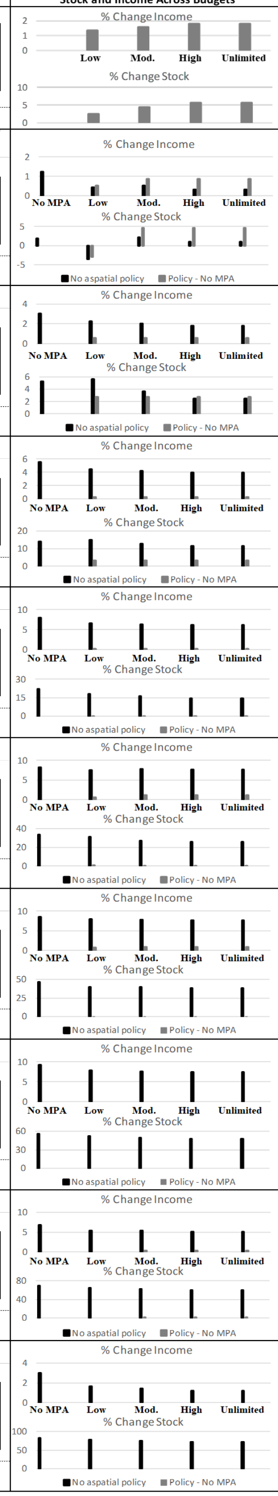

Figure H2. Income-maximizing manager's optimal MPA placement and enforcement over a range of budgets for different license levels. Note: the income-maximizing license level is 3 licenses.

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Marine Resource Economics 36(4). DOI: https://doi.org/10.1086/715818.

Figure H3: Open access labor allocation, fishing effort, and stock for different low license levels

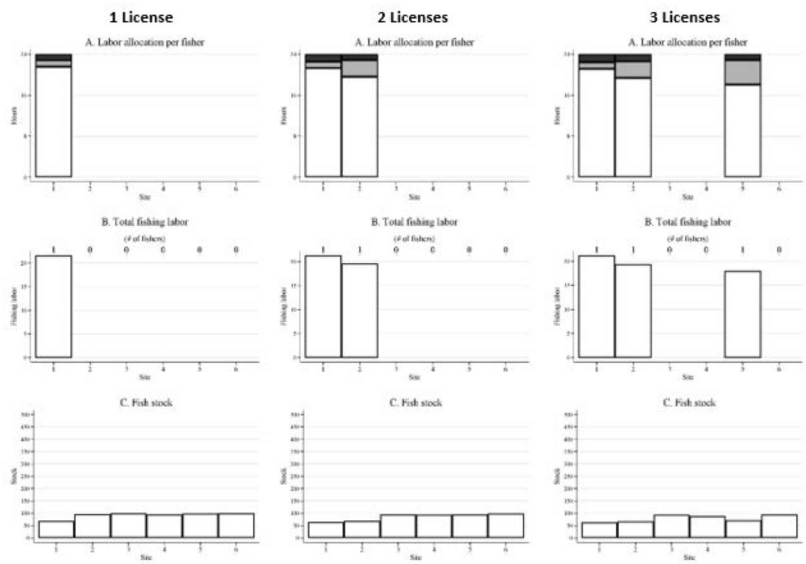

Figure H3: Labor allocation per fisher, total fishing effort, and fish stock per site for different low license levels.

Figure H4: Open access labor allocation, fishing effort, and stock for different moderate license levels

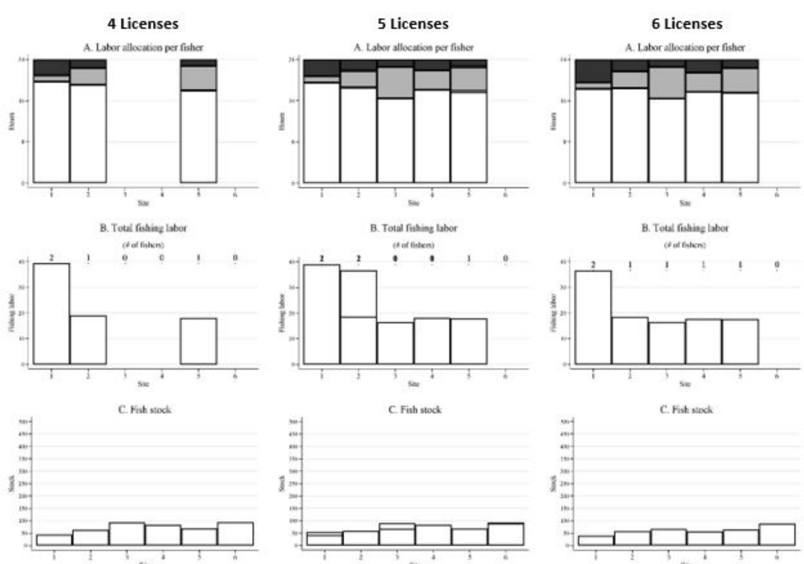

Figure H4: Labor allocation per fisher, total fishing effort, and fish stock per site for different moderate license levels.

Figure H5: Open access labor allocation, fishing effort, and stock for different high license levels

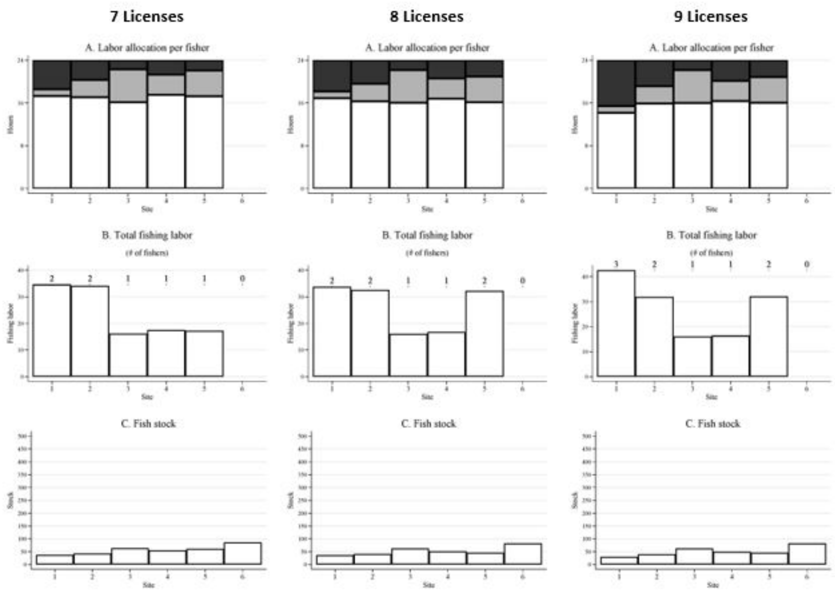

Figure H5: Labor allocation per fisher, total fishing effort, and fish stock per site for different high license levels.

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I. Gear Restriction Policies

Figure I1: ASL max MPAs for different gear restriction levels

	No MPA	Budget: Low	Budget: Moderate	Budget: High	Budget: Unlimited
1. Baseline	5 48.0 (4), 31.3 (2), 16.0 (1) 16.1 (1), 32.0 (2), 0.0 (0)	6 (+1) 42.2 (-1), 32.0 (=), 16.0 (=) 16.4 (=), 32.1 (=), 0.0 (=)	6 (+1) 41.4 (-1), 47.7 (+1), 0.0 (-1) 16.9 (=), 16.5 (-1), 15.4 (+1)	6 (+1) 28.5 (-2), 46.2 (+1), 15.9 (=) 17.3 (=), 31.9 (=), 0.0 (=)	6 (+1) 0.0 (-4), 75.1 (+3), 0.0 (-1) 33.4 (+1), 15.7 (-1), 15.2 (+1)
Enforcement	0	0.03	0.06	0.28	0.41
2. Gear +11%	5 50.2 (4), 31.3 (2), 15.7 (1) 16.0 (1), 31.6 (2), 0.0 (0)	5 (=) 48.8 (=), 46.8 (+1), 0.0 (-1) 16.6 (=), 16.3 (-1), 15.1 (+1)	5 (=) 48.8 (=), 46.8 (+1), 0.0 (-1) 16.6 (=), 16.3 (-1), 15.1 (+1)	6 (+1) 13.7 (-3), 62.5 (+2), 0.0 (-1) 32.3 (+1), 15.7 (-1), 15.0 (+1)	6 (+1) 0.0 (-4), 74.8 (+3), 0.0 (-1) 33.1 (+1), 15.6 (-1), 15.0 (+1)
Enforcement	0	0.02	0.02	0.34	0.4
3. Gear +22%	5 51.7 (4), 30.9 (2), 15.3 (1) 15.8 (1), 30.9 (2), 0.0 (0)	5 (=) 50.5 (=), 45.9 (+1), 0.0 (-1) 16.3 (=), 15.9 (-1), 14.7 (+1)	6 (+) 53.3 (=), 32.3 (=), 15.5 (=) 16.5 (=), 16.1 (-1), 0.0 (=)	5 (=) 76.2 (+2), 0.0 (-2), 15.8 (=) 0.0 (-1), 47.0 (+1), 0.0 (=)	5 (=) 76.2 (+2), 0.0 (-2), 15.8 (=) 0.0 (-1), 47.0 (+1), 0.0 (=)
Enforcement	0	0.03	0.07	0.13	0.13
4. Gear +33%	6 51.3 (4), 45.1 (3), 0.0 (0) 15.8 (1), 15.8 (1), 0.0 (0)	6 (=) 60.2 (+1), 31.6 (-1), 0.0 (=) 15.7 (=), 16.0 (=), 0.0 (=)	7 (+1) 52.4 (=), 46.8 (=), 0.0 (=) 16.4 (=), 0.0 (-1), 0.0 (=)	8 (+2) 0.0 (-4), 61.9 (+1), 0.0 (=) 31.9 (+1), 15.5 (=), 0.0 (=)	8 (+2) 0.0 (-4), 61.9 (+1), 0.0 (=) 31.9 (+1), 15.5 (=), 0.0 (=)
Enforcement	0	0.03	0.08	0.33	0.33
5. Gear +44%	8 52.8 (4), 31.0 (2), 0.0 (0) 15.4 (1), 0.0 (0), 0.0 (0)	8 (=) 65.3 (+1), 15.7 (-1), 0.0 (=) 0.0 (-1), 15.5 (+1), 0.0 (=)	8 (=) 75.2 (+2), 0.0 (-2), 0.0 (=) 0.0 (-1), 15.7 (+1), 0.0 (=)	9 (+1) 24.8 (-2), 46.1 (+1), 0.0 (=) 16.1 (=), 0.0 (=), 0.0 (=)	9 (+1) 24.8 (-2), 46.1 (+1), 0.0 (=) 16.1 (=), 0.0 (=), 0.0 (=)
Enforcement	0	0.03	0.1	0.24	0.24
6. Gear +55%	10 60.9 (5), 0.0 (0), 0.0 (0) 0.0 (0), 0.0 (0), 0.0 (0)	11 (+1) 51.9 (-1), 0.0 (=), 0.0 (=) 0.0 (=), 0.0 (=), 0.0 (=)	11 (+1) 48.3 (-1), 0.0 (=), 0.0 (=) 0.0 (=), 0.0 (=), 0.0 (=)	14 (+4) 0.0 (-5), 15.6 (+1), 0.0 (=) 0.0 (=), 0.0 (=), 0.0 (=)	14 (+4) 0.0 (-5), 15.6 (+1), 0.0 (=) 0.0 (=), 0.0 (=), 0.0 (=)
Enforcement	0	0.03	0.1	0.25	0.25
7. Gear +66%	14 12.5 (1), 0.0 (0), 0.0 (0) 0.0 (0), 0.0 (0), 0.0 (0)	15 (+1) 0.0 (-1), 0.0 (=), 0.0 (=) 0.0 (=), 0.0 (=), 0.0 (=)	15 (+1) 0.0 (-1), 0.0 (=), 0.0 (=) 0.0 (=), 0.0 (=), 0.0 (=)	15 (+1) 0.0 (-1), 0.0 (=), 0.0 (=) 0.0 (=), 0.0 (=), 0.0 (=)	15 (+1) 0.0 (-1), 0.0 (=), 0.0 (=) 0.0 (=), 0.0 (=), 0.0 (=)
Enforcement	0	0.03	0.03	0.03	0.03

Stock and Income Across Budgets

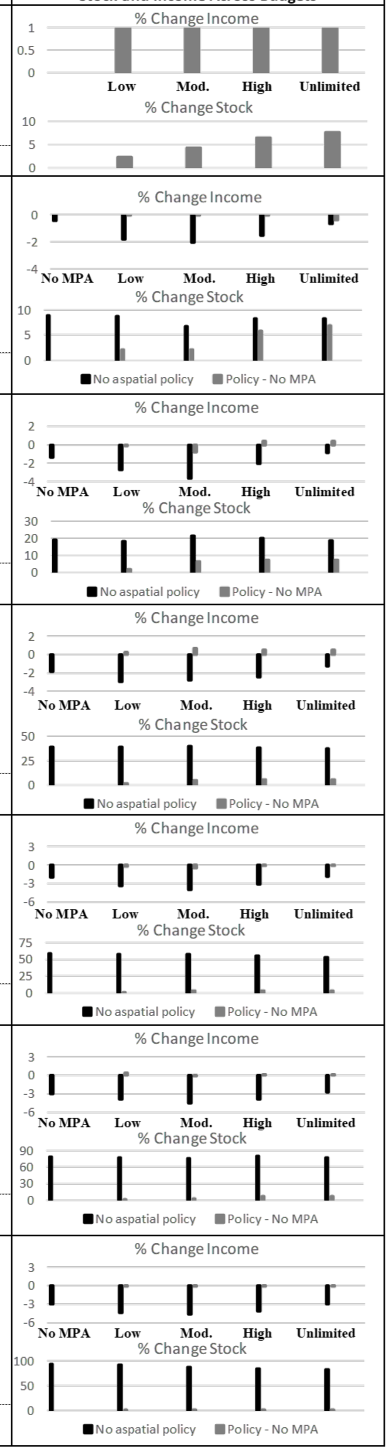

Figure I1. ASL-maximizing manager's optimal MPA placement and enforcement over a range of budgets for different gear restriction levels.

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Marine Resource Economics 36(4). DOI: https://doi.org/10.1086/715818.

Figure I2: Income max MPAs for different gear restriction levels

	No MPA	Budget: Low	Moderate	High	Unlimited
1. Baseline	5 48.0 (4) | 31.3 (2) | 16.0 (1) 16.1 (1) | 32.0 (2) | 0.0 (0)	6 (+1) 42.2 (-1) | 32.0 (=) | 16.0 (=) 16.4 (=) | 32.1 (=) | 0.0 (=)	6 (+1) 41.4 (-1) | 47.7 (+1) | 0.0 (-1) 16.9 (=) | 16.5 (-1) | 15.4 (+1)	6 (+1) 40.4 (-1) | 32.7 (=) | 16.0 (=) 16.8 (=) | 32.3 (=) | 0.0 (=)	6 (+1) 40.4 (-1) | 32.7 (=) | 16.0 (=) 16.8 (=) | 32.3 (=) | 0.0 (=)
Enforcement	0	0.03	0.06	0.18	0.18
2. Gear +11%	5 50.2 (4) | 31.3 (2) | 15.7 (1) 16.0 (1) | 31.6 (2) | 0.0 (0)	5 (=) 49.8 (=) | 31.4 (=) | 15.7 (=) 16.1 (=) | 31.6 (=) | 0.0 (=)	5 (=) 51.4 (=) | 32.1 (=) | 15.3 (=) 16.7 (=) | 16.0 (-1) | 14.8 (+1)	6 (+1) 41.3 (-1) | 32.6 (=) | 15.8 (=) 16.7 (=) | 31.9 (=) | 0.0 (=)	6 (+1) 41.3 (-1) | 32.6 (=) | 15.8 (=) 16.7 (=) | 31.9 (=) | 0.0 (=)
Enforcement	0	0.03	0.06	0.17	0.17
3. Gear +22%	5 51.7 (4) | 30.9 (2) | 15.3 (1) 15.8 (1) | 30.9 (2) | 0.0 (0)	5 (=) 51.2 (=) | 31.0 (=) | 15.3 (=) 15.9 (=) | 31.0 (=) | 0.0 (=)	6 (+1) 53.2 (=) | 32.2 (=) | 15.5 (=) 16.5 (=) | 16.2 (-1) | 0.0 (=)	6 (+1) 53.2 (=) | 32.2 (=) | 15.5 (=) 16.5 (=) | 16.2 (-1) | 0.0 (=)	6 (+1) 53.2 (=) | 32.2 (=) | 15.5 (=) 16.5 (=) | 16.2 (-1) | 0.0 (=)
Enforcement	0	0.03	0.05	0.05	0.05
4. Gear +33%	6 51.3 (4) | 45.1 (3) | 0.0 (0) 15.8 (1) | 15.8 (1) | 0.0 (0)	6 (=) 60.2 (+1) | 31.6 (-1) | 0.0 (=) 15.7 (=) | 16.0 (=) | 0.0 (=)	7 (+1) 52.4 (=) | 46.8 (=) | 0.0 (=) 16.4 (=) | 0.0 (-1) | 0.0 (=)	7 (+1) 40.8 (-1) | 46.5 (=) | 0.0 (0) 16.3 (=) | 15.9 (=) | 0.0 (=)	7 (+1) 40.8 (-1) | 46.5 (=) | 0.0 (0) 16.3 (=) | 15.9 (=) | 0.0 (=)
Enforcement	0	0.03	0.08	0.12	0.12
5. Gear +44%	8 52.8 (4) | 31.0 (2) | 0.0 (0) 15.4 (1) | 0.0 (0) | 0.0 (0)	8 (=) 52.8 (=) | 31.0 (2) | 0.0 (0) 15.4 (=) | 0.0 (=) | 0.0 (=)	8 (=) 52.8 (=) | 31.0 (2) | 0.0 (0) 15.4 (=) | 0.0 (=) | 0.0 (=)	9 (+) 26.8 (-2) | 45.8 (+1) | 0.0 (=) 16.1 (=) | 0.0 (=) | 0.0 (=)	9 (+) 26.8 (-2) | 45.8 (+1) | 0.0 (=) 16.1 (=) | 0.0 (=) | 0.0 (=)
Enforcement	0	0	0	0.19	0.19
6. Gear +55%	10 60.9 (5) | 0.0 (0) | 0.0 (0) 0.0 (0) | 0.0 (0) | 0.0 (0)	11 (+1) 51.9 (-1) | 0.0 (=) | 0.0 (=) 0.0 (=) | 0.0 (=) | 0.0 (=)	11 (+1) 51.9 (-1) | 0.0 (=) | 0.0 (=) 0.0 (=) | 0.0 (=) | 0.0 (=)	11 (+1) 51.9 (-1) | 0.0 (=) | 0.0 (=) 0.0 (=) | 0.0 (=) | 0.0 (=)	11 (+1) 51.9 (-1) | 0.0 (=) | 0.0 (=) 0.0 (=) | 0.0 (=) | 0.0 (=)
Enforcement	0	0.03	0.03	0.03	0.03
7. Gear +66%	14 12.5 (1) | 0.0 (0) | 0.0 (0) 0.0 (0) | 0.0 (0) | 0.0 (0)	14 (=) 12.5 (=) | 0.0 (=) | 0.0 (=) 0.0 (=) | 0.0 (=) | 0.0 (0)	14 (=) 12.5 (=) | 0.0 (=) | 0.0 (=) 0.0 (=) | 0.0 (=) | 0.0 (0)	14 (=) 12.5 (=) | 0.0 (=) | 0.0 (=) 0.0 (=) | 0.0 (=) | 0.0 (0)	14 (=) 12.5 (=) | 0.0 (=) | 0.0 (=) 0.0 (=) | 0.0 (=) | 0.0 (0)
Enforcement	0	0	0	0	0

Stock and Income Across Budgets

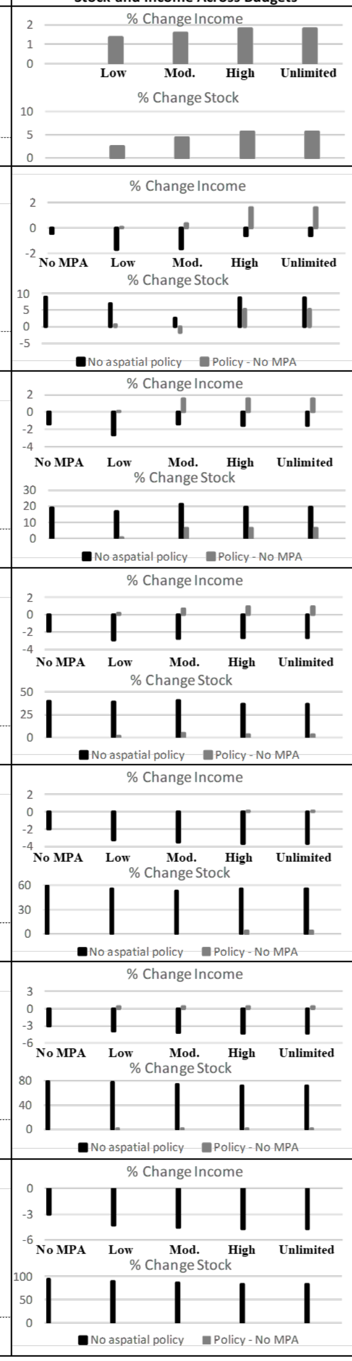

Figure I2. Income-maximizing manager's optimal MPA placement and enforcement over a range of budgets for different gear restriction levels.

Supplemental Material (not copyedited or formatted) for: Heidi Albers, Madison Ashworth, Tabaré Capitán, Róger Madrigal-Ballestero, Louis Preonas. 2021. "MPAs and Aspatial Policies in Artisanal Fisheries."
Marine Resource Economics 36(4). DOI: https://doi.org/10.1086/715818.

Figure I3: Open access labor allocation, fishing effort, and stock for different low gear restriction levels

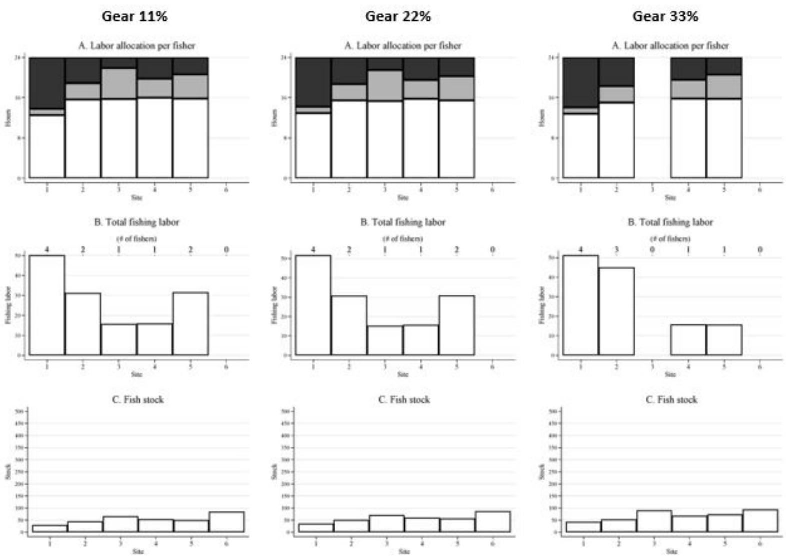

Figure I3: Labor allocation per fisher, total fishing effort, and fish stock per site for different low gear restriction levels.

Figure I4: Open access labor allocation, fishing effort, and stock for different high gear restriction levels

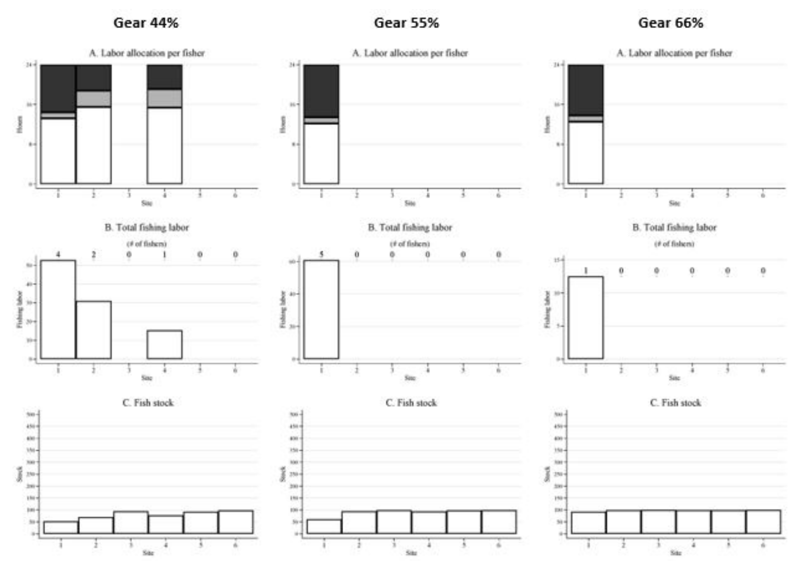

Figure I4: Labor allocation per fisher, total fishing effort, and fish stock per site for different high gear restriction levels

J. Income and Stock Impacts of MPAs and Aspatial Policies

Figure J1: Economic and ecological impact of ASL-max MPAs (B = 1)

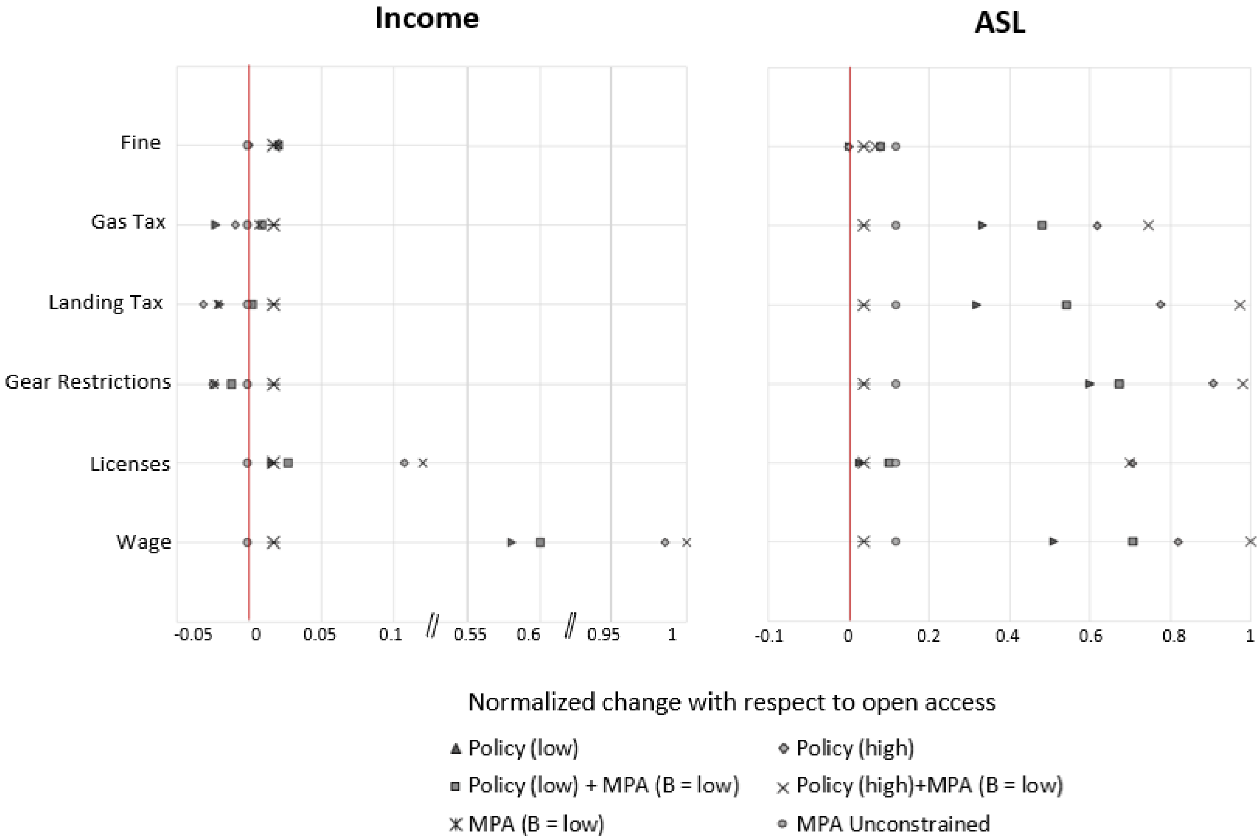

Figure J1. ASL and income responses to a high and low level of each aspatial policy, the ASL-maximizing manager's optimal MPA placement and enforcement level without the policy for an unconstrained case and a constrained case with a low enforcement budget (1), and the optimal MPA for an unconstrained and a constrained case for each policy level. The aspatial policy levels are the same as in Figures 1 and 2. (Note scale gaps on x-axis.)

Figure J2: Economic and ecological impact of income-max MPAs (B = 1)

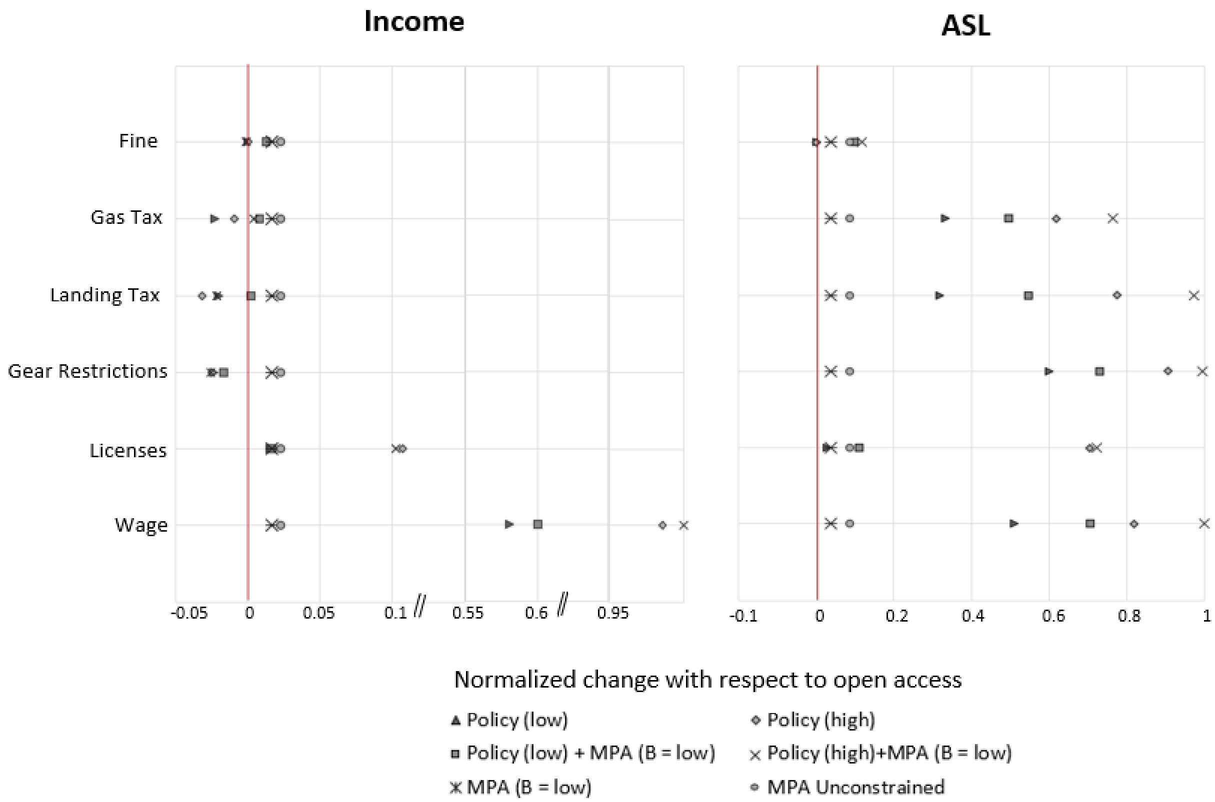

Figure J2. ASL and income responses to a high and low level of each aspatial policy, the income-maximizing manager's optimal MPA placement and enforcement level without the policy for an unconstrained case and a constrained case with a low enforcement budget (1), and the optimal MPA for an unconstrained and a constrained case for each policy level. The aspatial policy levels are the same as in Figures 1 and 2. (Note scale gaps on x-axis.)

Figure J3: Economic and ecological impact of ASL-max MPAs (B = 10)

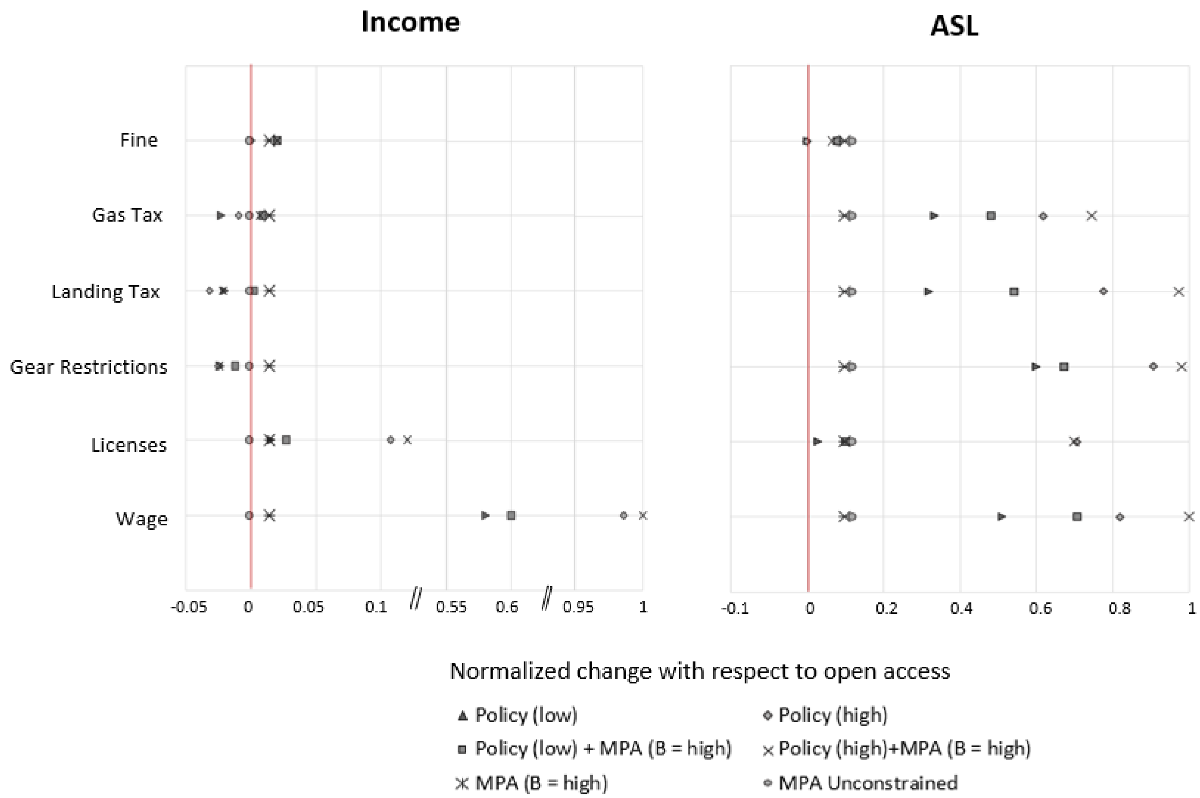

Figure J3. ASL and income responses to a high and low level of each aspatial policy, the ASL-maximizing manager's optimal MPA placement and enforcement level without the policy for an unconstrained case and a constrained case with a low enforcement budget (10), and the optimal MPA for an unconstrained and a constrained case for each policy level. The aspatial policy levels are the same as in Figures 1 and 2. (Note scale gaps on x-axis.)

Figure J4: Economic and ecological impact of income-max MPAs (B = 10)

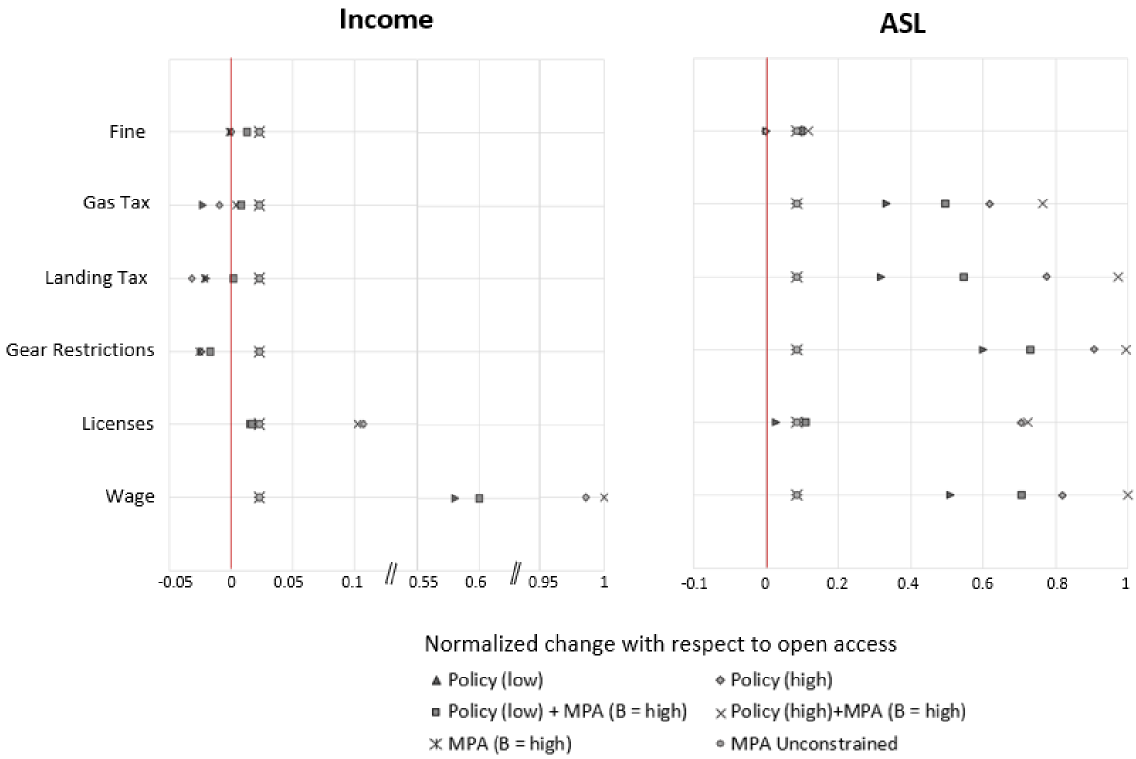

Figure J4. ASL and income responses to a high and low level of each aspatial policy, the income-maximizing manager's optimal MPA placement and enforcement level without the policy for an unconstrained case and a constrained case with a low enforcement budget (10), and the optimal MPA for an unconstrained and a constrained case for each policy level. The aspatial policy levels are the same as in Figures 1 and 2. (Note scale gaps on x-axis.)

Figure J5: Economic and ecological impact of ASL-max MPAs (B = 60)

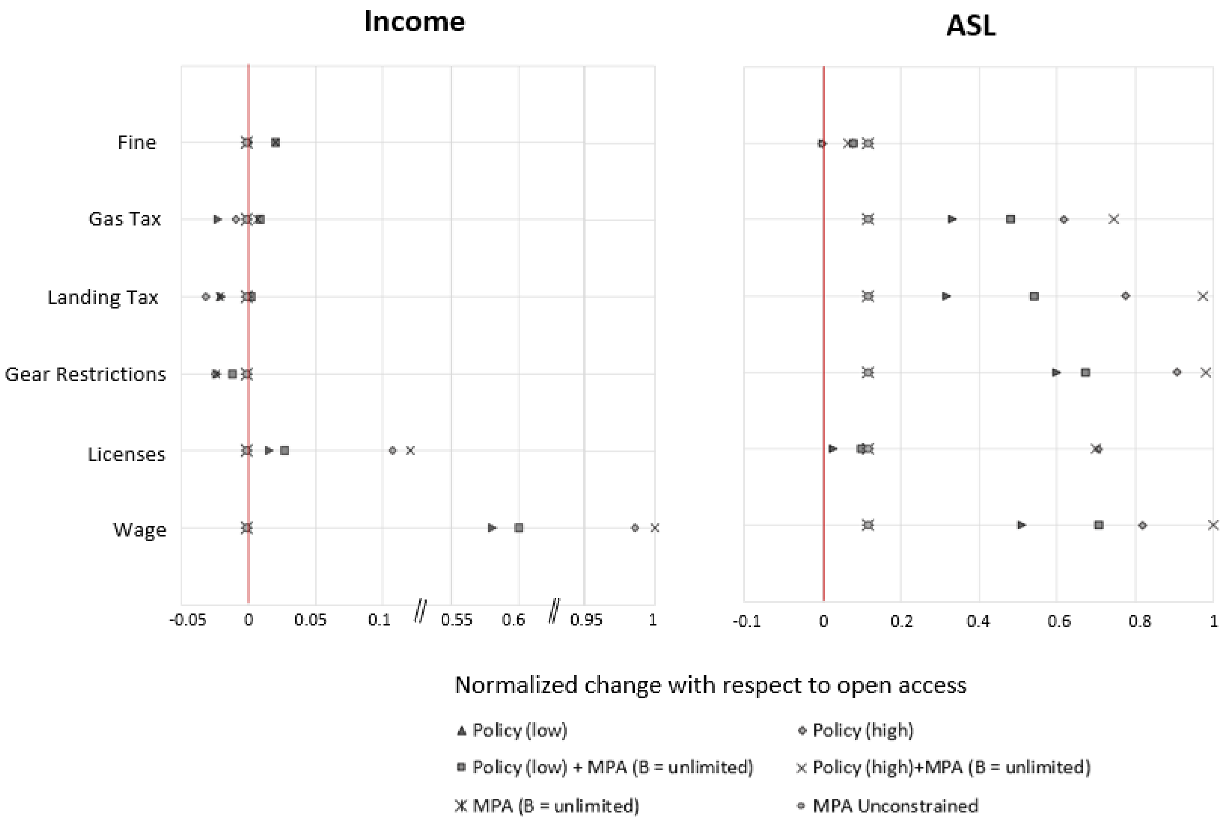

Figure J5. ASL and income responses to a high and low level of each aspatial policy, the ASL-maximizing manager's optimal MPA placement and enforcement level without the policy for an unconstrained case and a constrained case with a low enforcement budget (60), and the optimal MPA for an unconstrained and a constrained case for each policy level. The aspatial policy levels are the same as in Figures 1 and 2. (Note scale gaps on x-axis.)

Figure J6: Economic and ecological impact of income-max MPAs (B = 60)

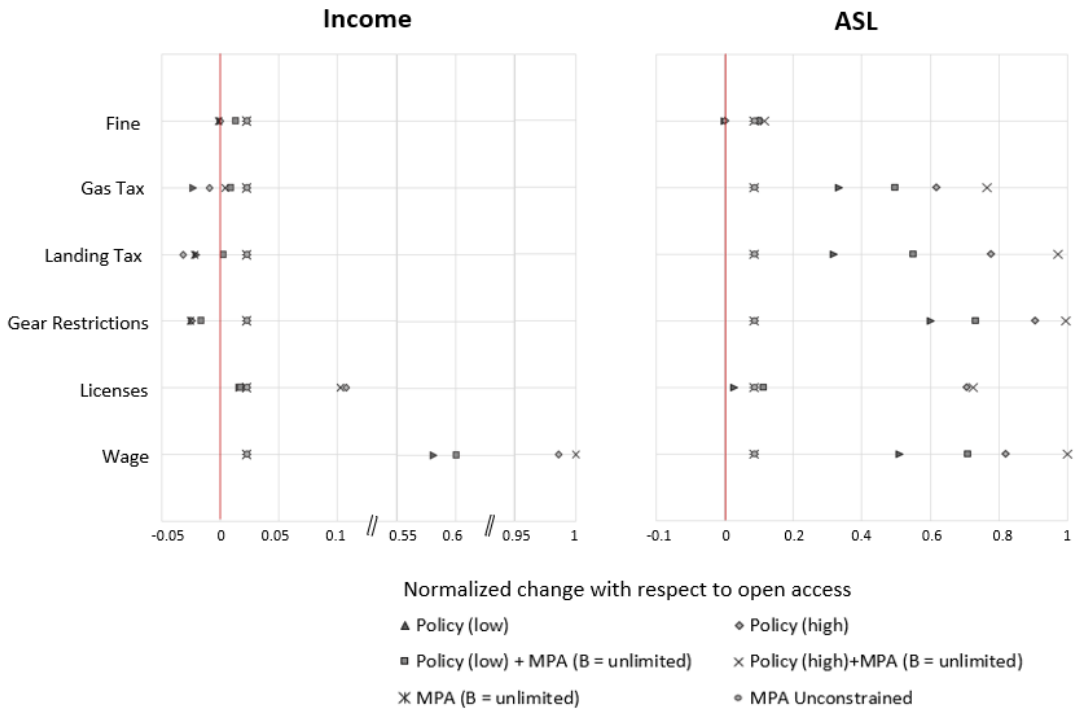

Figure J6. ASL and income responses to a high and low level of each aspatial policy, the income-maximizing manager's optimal MPA placement and enforcement level without the policy for an unconstrained case and a constrained case with a low enforcement budget (60), and the optimal MPA for an unconstrained and a constrained case for each policy level. The aspatial policy levels are the same as in Figures 1 and 2. (Note scale gaps on x-axis.)