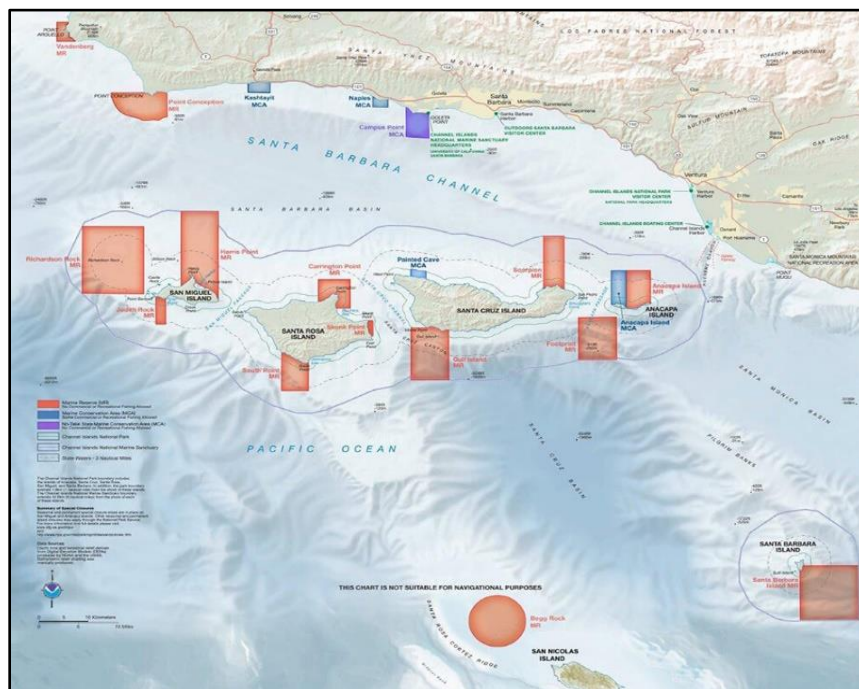


# NOAA Channel Islands National Marine Sanctuary Contributions to California MPA Decadal Management Review

## OVERVIEW

The network of marine reserves and marine conservation areas (MPAs) within Channel Islands National Marine Sanctuary (CINMS and sanctuary) was created through a close partnership between NOAA and the state of California, designated in phases from 2004-2007. These zones encompass approximately 20% of the sanctuary, or 241 square nautical miles (Figure 1). This report draws on the considerable MPA management experience of CINMS staff acquired since the beginning of a stakeholder-based planning process employed in 1999-2001, extending through agency designation processes, and 17 years of cooperative management activities. In this report we cover CINMS' role implementing MPA education and outreach, research and monitoring, and enforcement, working with supporting partners.



**Figure 1.** State/Federal marine reserves and conservation areas within Channel Islands National Marine Sanctuary, and along the Santa Barbara Channel coast. Map source: NOAA/CINMS, available at <https://channelislands.noaa.gov/mariners/>.

## Channel Islands MPA Network: Purpose and Co-Management

The purposes for which the National Oceanic and Atmospheric Administration (NOAA) established the federal MPAs to complement the state MPAs were to:

- Protect and restore habitats and ecosystems;
- Provide a refuge for all sea life;
- Provide reference areas for research and educational opportunities; and

- Protect our nation's marine natural heritage for future generations.

Managing, monitoring, and enforcing Channel Islands MPAs is a collaborative effort involving California Department of Fish and Wildlife (CDFW), Channel Islands National Park (CINP), the U.S. Coast Guard (USCG), Sanctuary Advisory Council, University of California, other academic institutions, and non-governmental organizations. Working in a co-management capacity with the State of California, CINMS supports both regional and statewide MPA management including:

- Sustained education and outreach to ocean users and K-16 students;
- Co-chairing the Santa Barbara Channel MPA Collaborative;
- Facilitating the Sanctuary Advisory Council, made up of stakeholder and agency representatives;
- In-house and external support of MPA monitoring, from intertidal to deep water habitats;
- Coordination of cooperative enforcement via the multi-agency Island Sentinel Group;
- Developing, testing, and promoting enforcement technology; and
- Support of general MPA administration with the Statewide Leadership Team.

## Collaborative Approaches and Advancements

CINMS staff develop and support collaborative partnerships on MPA monitoring, enforcement, and education/outreach. Our research vessels support monitoring conducted by a variety of partners, and our science staff conduct data analysis and assessment of MPA study results. Our education and outreach team has pioneered materials and messaging to effectively reach ocean users and students, influencing and assisting CDFW efforts statewide. We co-chair the Santa Barbara Channel MPA Collaborative, continuing to share resources and lessons learned to other State MPA networks in our region. Our efforts to convene and coordinate multiple law enforcement agencies has helped prioritize patrol and case processing of MPA violations. In addition, we developed mobile technologies to assist law enforcement efforts, such as the electronic Fisheries Information Network System (eFINS), and remote sensing technologies such as the Marine Monitor shore-based radar systems that have been advanced and implemented by CINMS staff and expanded along the California coast<sup>1</sup>.

## Stakeholder Involvement and Input

The 42-member CINMS Advisory Council ([Sanctuary Advisory Council](#)), composed of local stakeholders and agency partners, plays a unique role informing NOAA and CDFW management decisions affecting the establishment and ongoing management of the Channel Islands MPA network. At the invitation of the California Fish and Game Commission (FGC) in 1999, CINMS and CDFW staff, working through the Sanctuary Advisory Council, embarked upon the state's first community-based consideration of a groundbreaking network of marine reserves and conservation areas. The advisory council's robust [stakeholder engagement and scientific input processes](#) provided a foundation upon which CDFW, the FGC, and NOAA created the joint state/federal MPA network at Channel Islands from 2003-2007. The advisory

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<sup>1</sup> <https://protectedseas.net/marine-monitor-m2>

council provided valuable insights during the design and implementation phase, and it continues to inform MPA management. CDFW and the Ocean Protection Council (OPC) are important participating members on the Sanctuary Advisory Council.

The advisory council recently provided input on the Channel Islands MPAs, revealing stakeholder insights that CDFW and NOAA should consider<sup>2</sup>, including consideration of network expansion, reduction, or modification.

## Recommendations and Next Steps

- 1) *Invest in the Unique Value of the Channel Island MPAs.* The Channel Islands MPA network continues to guide successful implementation of the Marine Life Protection Act. Valuable lessons have been learned over 23 years of MPA design, planning, management, stakeholder engagement, research, education, and enforcement activities conducted at the Channel Islands. Biological monitoring data sets are the oldest in the state, providing important insight into expected effects elsewhere. Enforcement techniques and pilot projects provide knowledge and tools that help the entire State MPA system. Similarly, education and outreach materials originated by and within CINMS provide valuable templates for other regions. Continued active participation on the Sanctuary Advisory Council by state agency representatives from CDFW and OPC is paramount to this co-management. *Therefore, we strongly recommend the state increase investment of resources into the co-management of this unique MPA network.*
- 2) *MPA Network Support through Implementation of New CINMS Management Plan.* In 2022 we will publish an updated CINMS management plan with a new Zone Management Action Plan, and a Climate Change Action Plan, that support the Channel Islands MPA network and advance our understanding of the role these zones play relative to ecosystem function and climate resilience. The CINMS management plan is currently available as a [draft](#)<sup>3</sup>.
- 3) *Future Regulatory Review of Channel Islands MPAs.* Following the MPA Decadal Review Process, CINMS, plans to evaluate the federal waters portions of the joint state/NOAA network of Channel Islands MPAs. At that time, NOAA will invite and encourage CDFW to participate in a joint review. As part of this review, we will continue to engage the Sanctuary Advisory Council, and approach the Pacific Fishery Management Council as needed.

Learning from the MPA Decadal Review and engaging with local stakeholders, we look forward to working together with CDFW and other partners to collaboratively support, evaluate and adapt the management of Channel Islands MPA network now and into the future.

## EDUCATION & OUTREACH

CINMS supports both regional and statewide MPA Management efforts through our education and outreach. Beginning in 2003, CINMS worked with CDFW, National Park Service (NPS) and

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<sup>2</sup> See Sanctuary Advisory Council comments and ratings for rows D3 through D10 of this table: <https://nmschannelislands.blob.core.windows.net/channelislands-prod/media/docs/20200319-cinms-mpr-scoping-comment-worksheet-scores.pdf>.

<sup>3</sup> <https://channelislands.noaa.gov/media/docs/2021-cinms-draft-management-plan.pdf>

the [Sanctuary Advisory Council](#) to form a marine reserves education working group that developed an education and outreach strategic plan. The plan outlined strategies that defined target stakeholder audiences: i.e., in the short term, commercial and recreational users that needed to know the MPA regulations; and in the longer term, science and conservation stakeholders (i.e. K-16 audiences, informal science educators, families). The plan also ranked different outreach methods. From this effort, [standardized MPA map graphics](#) and [key messages](#) were developed to highlight the MPA network as well as CINMS, guiding consistent MPA outreach via brochures, signs, kiosks, and exhibits. Additionally, in 2012, these MPA graphics and messages served as a template for the design of signs, brochures, and other interactive outreach tools for the larger California MPA network.

From 2004 to 2017, CINMS made capital investments to design and fabricate MPA interpretive enforcement signs at 3 different harbor departure locations and 5 popular Channel Island landing coves. Also, during this time, 8 informational electronic kiosks about the sanctuary and the Channel Islands MPA network were installed at key locations within Ventura and Santa Barbara counties, including at 3 fuel docks in Santa Barbara, Ventura, and Channel Islands Harbors, and with key visitor centers and island transportation providers. Additionally, exhibits featuring the MPA network were fabricated for the Channel Islands Boating Center in Channel Islands Harbor in 2013 to help inform students participating in boating and safety instruction programs about the MPA network in our region, and their role in protecting these special places.

CINMS education and outreach programs align well with goal 3 of the Marine Life Protection Act: *“to improve recreational, educational, and study opportunities provided by marine ecosystems that are subject to minimal human disturbance, and to manage these uses in a manner consistent with protecting biodiversity.”* CINMS works closely with K-16 partners to develop education and outreach activities about the science of MPAs for middle, high school and college students. Through funding from NOAA’s Bay Watershed Education Training Federal Grant Program ([BWET](#)), CINMS leverages partnerships with teachers, school district science coordinators, informal education partners, colleges, and universities to develop curriculum activities, resources, and programs that utilize Channel Islands MPA monitoring data, visualizations, and the CINMS Webenized Condition Report.

Over the years, our agency has hosted workshops to train scientists, stakeholders, agency staff, and recreational operators (kayak operators, whale watch boats, etc.) on key MPA messages to share with the public. For example, in 2008 CINMS helped organize the [5 year review of MPA network at the California Islands](#) workshop that was part of the California Islands Symposium, highlighting MPA outreach and engagement to increase awareness and compliance for the Channel Islands MPA network.

CINMS partners closely with NPS to coordinate the Channel Islands Naturalist Corp Volunteer program (CINC). CINC are a group of over 150 volunteers that are specially trained to educate passengers visiting the sanctuary and park on board whale watching vessels and island concessionaires, including conveying key messages about the Channel Islands MPA network.

Following the completion of the statewide MPA network in 2012, our role expanded to also support the larger statewide network and the newly formed MPA Collaborative network.

Currently, the CINMS Team Lead for Education and Outreach serves as a Co-Chair of the [Santa Barbara Channel MPA Collaborative](#) and works closely with other key stakeholders in the region to develop MPA outreach products and tools targeting different stakeholder users and interests. CINMS is committed to ensuring that recreational and commercial fishers and Chumash community indigenous representatives are brought into the collaborative network to help develop balanced messaging about MPAs. Looking forward, CINMS will continue to serve in a supporting role to the MPA collaborative network.

## Highlights and Key Findings

CINMS offers a deep level of expertise on approaches to effectively engage different audiences about the MPA network. Channel Islands MPAs serve as a network within the larger state MPA network, with key Channel Islands stakeholders remaining actively engaged with both the Sanctuary Advisory Council and the larger MPA network.

- *Creation and distribution of outreach materials.* Since 2003, over 95,000 copies of [Protecting Your Channel Islands Brochure](#) have been distributed to diverse stakeholders in our region. These brochures are distributed by multiple law enforcement agencies. Additionally, through a partnership with California Boating and Waterways, NPS, Ventura Power Squadron and the County of Ventura, in 2007 CINMS designed and printed [Boating and Safety](#) brochures. Over 28,000 copies of the brochure were mailed to registered boaters within Ventura and Santa Barbara counties and 10,000 brochures were also distributed by NOAA Office of Law Enforcement officers, NPS Rangers, and CDFW Wardens to boaters visiting the Channel Islands.
- *Capital investments in signs, kiosks, and exhibits.* The Office of National Marine Sanctuaries (ONMS) invested over \$1,057,000 to design, fabricate and install signs, kiosks and exhibits that provide information about the MPA network between 2003 and 2020. Channel Islands MPA signs are installed at different [Channel Islands National Park Landing Coves](#) and at Harbor [boat launch ramps](#) in Santa Barbara and Ventura Counties. Interactive [kiosks](#) in partner visitor centers and at fuel docks provide interpretation about MPAs in the Channel Islands region. The [Channel Islands Boating Center](#) features [interactive exhibits](#) that highlight information about the MPA network.
- *Interactive map tools.* Working with Santa Barbara Channel MPA Collaborative, CINMS updated the software and expanded the Channel Islands MPA Interactive map to include all 52 MPAs in southern California. [The Southern California MPA Interactive Story Map](#) offers users information, images and links to plan visits for the 52 MPAs in Southern California.

## Challenges

- Reaching diverse audiences continues to be a challenge. There is a lack of MPA outreach materials and programs available in languages other than English and Spanish. Given the cultural diversity of California and the increase in subsistence fishing and intertidal collecting along the California Coast, *MPA outreach materials should be translated into more languages and dialects to effectively reach these different communities.* New approaches to effectively engage these audiences need to be better understood and prioritized.

- There should be better engagement with inland California communities about MPAs.
- Signs, interactive technology tools like kiosks, and exhibits need to be maintained, updated, or replaced periodically over time. This requires ongoing funding for replacements, re-designs, upgrades, and new installations.

## Knowledge Gaps and Recommendations

ONMS will continue to collaborate with the state of California on the development of interpretive outreach products that effectively target priority user groups. CINMS commits to continue engaging in the [Santa Barbara Channel Marine Protected Area Collaborative](#)<sup>4</sup> education and outreach efforts. We will support enhanced public understanding of and compliance of the marine reserves and conservation areas within the region. Through the collaborative network, we will pursue grants, create new outreach products, assess compliance, and work with a variety of stakeholders, including fishing and indigenous communities.

## RESEARCH AND MONITORING

The CINMS Research Team has taken a two-pronged approach to enhancing our collective understanding of MPA efficacy from pre-MPA implementation through to the present. First, CINMS contributes vessel time, issues research permits, develops MPA proposals, and offers local knowledge to aid key partnerships in monitoring efforts. The second prong of the CINMS approach focuses on data analysis and synthesis.

In general, research and monitoring activities show that the Channel Islands MPAs have resulted in measurable benefits to fish populations and habitats. Monitoring in kelp forest and mid-depth seafloor habitats has shown that biomass and abundance of some species are increasing at a higher rate in marine reserves than in areas that are open to fishing. This “reserve effect” is more pronounced for species subject to fishing pressure such as lobster, sea cucumber, and sheephead. Non-target and lightly fished species have shown no consistent patterns relative to protection. A summary of these “MPA Effects” findings is included within the [CINMS Condition Report](#) (ONMS 2019<sup>5</sup>, pp. 75-80). Additionally, work by CINMS staff in conjunction with the Partnership for Interdisciplinary Studies of Coasts and Oceans (PISCO) has demonstrated the impact of recent climatic events on living marine resources within and outside MPAs at the islands ([Freedman et.al. 2020](#)<sup>6</sup>).

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<sup>4</sup> Santa Barbara Channel MPA collaborative: <https://www.mpacollaborative.org/santabarbara/>.

<sup>5</sup> Office of National Marine Sanctuaries (ONMS). 2019. Channel Islands National Marine Sanctuary 2016 Condition Report. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries, Silver Spring, MD. 482 pp. <https://nmssanctuaries.blob.core.windows.net/sanctuaries-prod/media/docs/2016-condition-report-channel-islands-nms.pdf>

<sup>6</sup> Freedman, R.M., Brown, J.A., Caldwell, C. *et al.* Marine protected areas do not prevent marine heatwave-induced fish community structure changes in a temperate transition zone. *Sci Rep* 10, 21081 (2020). <https://doi.org/10.1038/s41598-020-77885-3>.

<sup>7</sup> Gugliotti, EF, DeLorenzo, ME, Etnoyer, PJ (2019) Depth-dependent temperature variability in the Southern California bight with implications for the cold-water gorgonian octocoral *Adelogorgia phyllosclera* JEMBE 514-515; 118-126. <https://doi.org/10.1016/j.jembe.2019.03.010>

## Highlights and Key Findings

- The CINMS 2016 [Condition Report](#) features a synthesis of status and trends data related to the CINMS MPA network. CINMS will provide supporting data streams to the 10-year review process in conjunction with our partners listed below;
- Acquisition of high-resolution seafloor bathymetry and backscatter is now complete for the state waters surrounding the Channel Islands. This effort, led by CINMS, was completed as part of the Southern California Seafloor Mapping Initiative, a multi-agency consortium. Data will be made available through National Centers for Environmental Information (NCEI). Additional funding and analyses will be needed to complete a classified habitat map from this base data in order to more effectively assess MPA performance, design and connectivity;
- CINMS in partnership with NOAA's Integrated Ocean Observing System (IOOS) program and EcoQuants developed a ["webenized" condition report](#). Here synthesized data products depicting status and trends data can automatically update as new data becomes available on partner project servers. Indicators of MPA performance can be displayed in ways to maximize their accessibility to various agencies and stakeholders;
- MPAs can be effective in boosting ecosystem resilience and recovery to acute climate stressors. This observed MPA effect is especially prominent for algae and invertebrates; however, fish communities tended to respond similarly to environmental stressors whether inside or outside MPAs (Freedman et al., in press). These results and data will be made available to the OPC-funded National Center for Ecological Analysis and Synthesis (NCEAS) California MPA Network Assessment Working Group.
- In partnership with the National Centers for Coastal Ocean Science (NCCOS) and Marine Applied Research and Exploration (MARE), scientists have found temperature stresses (Gugliotti et al. 2019) and increasing OA (Gomez et al. 2018) are decreasing the suitable habitat for deep sea corals and sponges inside and outside sanctuary MPAs;
- NOAA scientists discovered a massive (over a kilometer in length) dead glass sponge reef in the Footprint MPA. Further exploration and characterization of this region is enhancing our understanding of MPA performance in the area.
- ONMS, Bureau of Ocean Energy Management (BOEM), NOAA Fisheries, U.S. Geological Survey (USGS), and several NGOs supported quantitative visual surveys of the seafloor aboard the E/V *Nautilus*. Data analysis will provide further insight into potential climate change impacts inside and outside of existing MPAs.

## Partners in Monitoring

- [Partnership for Interdisciplinary Studies of Coasts and Oceans \(PISCO\)](#)
- [University of California, Santa Barbara - Santa Barbara Coastal Long-Term Ecological Research \(SBC LTER\)](#)
- [Channel Islands National Park \(CHIS\) - Kelp Forest Monitoring \(KFM\) Program](#)
- [Marine Applied Research & Exploration \(MARE\)](#)

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<sup>8</sup>Gomez, CE, Wickes, L, Deegan, D, Etnoyer, PJ, Cordes, EE (2018) Growth and feeding of deep-sea coral *Lophelia pertusa* from the California margin under simulated ocean acidification conditions. PeerJ 1-23 6:e5671; DOI 10.7717/peerj.5671

- [Multi-Agency Rocky Intertidal Network \(MARiNe\)](#)

## Permitting MPA Research

Through the issuance of federal research permits (CFR Title 15 § 922.74) to many of the partners listed above and others, CINMS supports MPA research and monitoring. CINMS has issued dozens of permits over the last 10 years for MPA research focused on deep sea corals; larval, juvenile and mature fish; invertebrate recruitment and movement; and habitat mapping and characterization.

## Research Vessel Support

Since 2010 CINMS research vessels (R/V *Shearwater* and R/V *Shark Cat*) have completed over 425 days at sea (DAS) in support of over 30 different MPA-related research projects. This work includes dive surveys, ROV exploration and sampling, CTD casts, water samples, fish stock assessments, and acoustic instrument data collection. So far in 2022, CINMS has received 10 project proposals for vessel time relating to MPA work totaling 67 DAS.

## Challenges

The coronavirus pandemic significantly impeded NOAA ship-based operations and may continue to impact NOAA ship and small boat (SHEARWATER) availability for all operations including SCUBA and submersible work. Federal funding to sanctuaries and other key NOAA programs for research and monitoring work is also limited.

## Knowledge Gaps and Recommendations

- Complete development of seafloor habitat maps to fully characterize MPAs within the sanctuary.
- Improve understanding of climate change impacts to ecosystems and ecosystem services, and the extent to which existing MPA network designs enhance ecosystem resilience, including in deeper waters beyond SCUBA depth. We recommend increased annual support and funding for monitoring deep-water habitats and biological and human communities.
- Improve understanding of the socioeconomic and cultural implications of MPA networks for tribal and coastal communities; (see CINMS 2016 [Condition Report](#) for Chumash perspective).
- Develop demographic data and analyses to assess Equity, Environmental Justice, Diversity, and Inclusion dimensions. Include gender, age, race/ethnicity, zip code/residence, education levels, household income, and household size in future MPA user surveys (e.g. commercial fishing, commercial passenger fishing vessels, etc.); perhaps through fishing and boating licensing.
- Improve understanding of MPA network effects on fisheries and fish stock sustainability. Develop fisheries catch per unit effort data on smaller spatial scales to allow measurement of MPA network effect on fish stocks and fishing communities, perhaps as



part of fish landing data collection. Data could be aggregated as needed when shared publicly to protect privacy.

- Learn more about cultural practices and incorporate more indigenous and local knowledge.
- Use MPAs to assess climate impacts on coastal communities. We are working on best practices and preliminary analyses to understand how humans interact with, benefit from and use ocean resources, and the associated contributions of MPAs.
- We recommend regular collection of demographic data and the adaptation of fisheries data to enable better assessment of MPAs effects on communities. This includes establishment of a formal socioeconomic and cultural monitoring program inclusive of these stakeholders: commercial and recreational fishing, non-consumptive recreational users (e.g. kayakers, whale watchers, scuba divers), coastal communities near MPAs, ocean users from other communities, and tribal communities to better understand the connectivity and value of MPAs.

## References

- [Channel Islands Marine Protected Areas: First 5 Years of Monitoring: 2003-2008](#)
- [PISCO: Channel Islands MPAs After 10 Years](#)
- [Channel Islands Condition Report](#)
- [Socioeconomic-Channel Islands](#)

## COMPLIANCE & ENFORCEMENT SUPPORT

CINMS relies on state and federal enforcement partners to patrol sanctuary waters and protect sanctuary users, visitors, wildlife, and ecosystems. Regular patrols are conducted by air and sea by USCG personnel, CDFW, and NPS rangers. NOAA's Office of Law Enforcement provides patrol and investigative support, and CINMS staff provide technical and data analysis support. All of the agencies benefit greatly from leveraging alliances and working cooperatively.

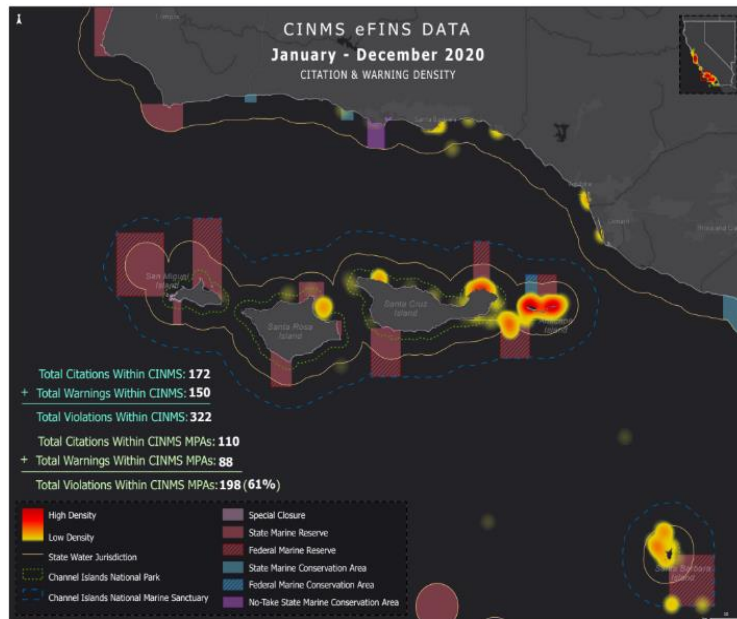
To maximize enforcement partnerships, CDFW wardens and other marine patrol officers depend on effective tools and technologies that help them to collect, reference, and share data. Two enforcement initiatives supported by CINMS are the electronic Fisheries Information Network (eFINS) and Marine Monitor (M2), described below. Additional information on these technologies can be referenced in the DMR submissions from Resources Legacy Fund (RLF) and ProtectedSeas.

## Highlights and Key Findings

### electronic Fisheries Information Network (eFINS)

The California Marine Sanctuary Foundation (CMSF) and CINMS maintain and manage a mobile data collection and sharing application (app) provided to CDFW and other California marine enforcement partners to electronically record, store, and reference geospatial data taken during patrols (Figure 2). CDFW marine wardens and CINP rangers have been collecting field

data from 2017 to the present as they perform compliance checks with commercial and recreational fishers in the sanctuary and throughout CDFW's marine domain. eFINS rolled out in the Channel Islands region and expanded in 2019 to include additional CDFW patrol vessels and units throughout the state. *A total of 115 marine patrol officers across the state have eFINS access.*



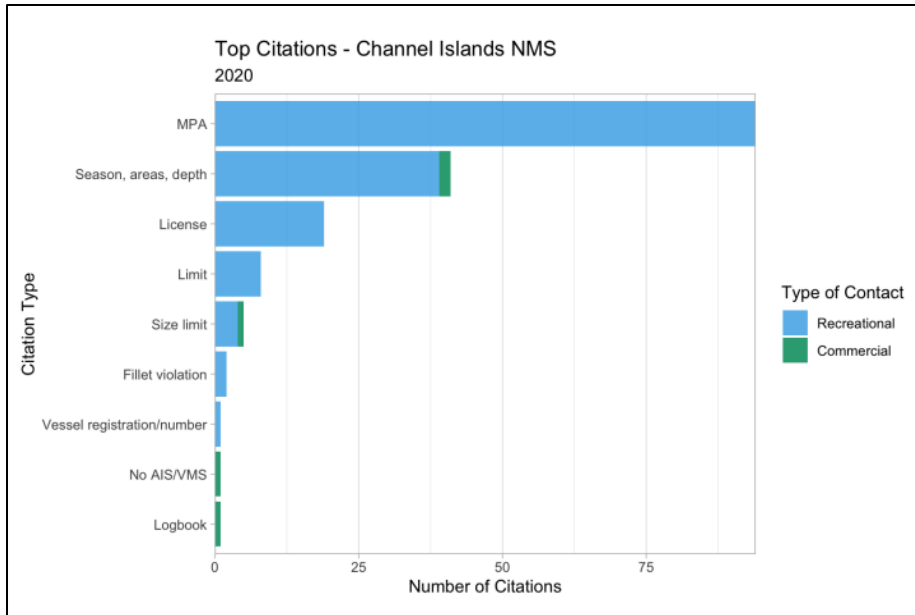
**Figure 2.** Sample map product showing violation (citation and warning) density of eFINS data in CINMS

### Cooperative Enforcement

An excellent example of enforcement collaboration is the Island Sentinel Cooperative Enforcement Group that includes the above-named agencies, and other enforcement partners. Island Sentinel meets on a monthly basis to share intelligence, coordinate patrols, and align enforcement priorities.

### Interpretive Enforcement

CINMS' extensive support and contribution to educating and connecting with fishing communities with outreach support from enforcement partners is highlighted in the education and outreach section above.



**Figure 3.** Top citations in 2020 as documented in eFINS in CINMS.

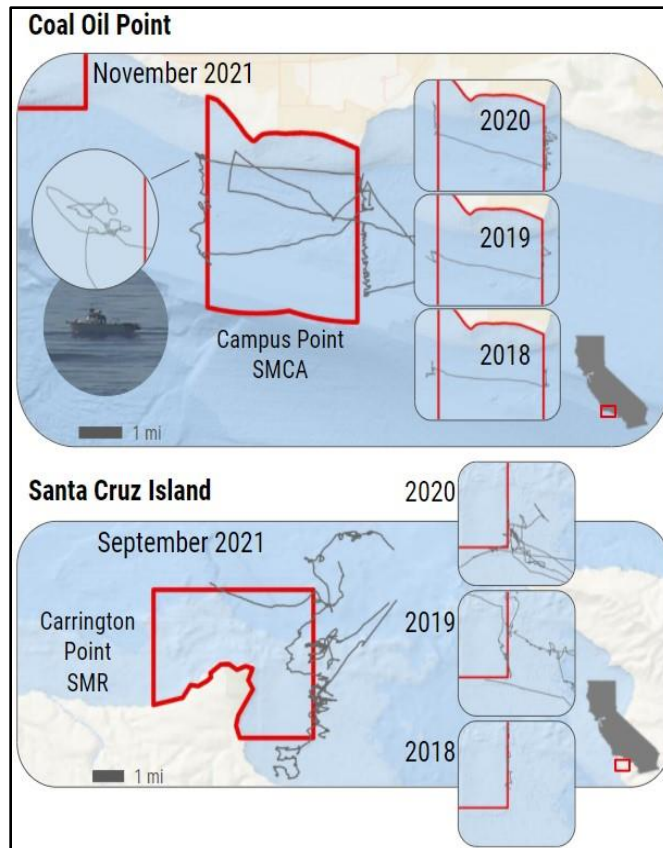
### Enforcement cross training

CINMS staff present at annual CDFW Warden training sessions, highlighting the state/federal MPA network and enforcement support tools described herein.

### Marine Monitor (M2) Shore-based radar

Access to vessel movement data for vessels that do not transmit via Automatic Identification System (AIS) or Vessel Monitoring System (VMS) is limited. Since 2015, a collaboration of scientists, agency partners, and nonprofits have piloted shore-based monitoring systems – known as Marine Monitor (M2) – to test autonomous remote sensing to observe, track, and analyze vessel data in nearshore areas (Figure 3).

M2 is a shore-based radar, AIS, and camera system that functions in off-the-grid environments and detects and records vessel activity offshore. M2 automatically scans, tracks and records vessel activity, and informs patrol officers and other resource managers about vessel activity historically and in real-time.



**Figure 4.** Examples of M2 radar vessel tracks from Coal Oil Point and Santa Cruz Island.

- Historical data can be utilized to better understand trends in human use and activity;
- Real-time data can be used to inform enforcement effort and provide on-scene assessments of activity;
- Nine systems are currently deployed (six are currently active);
- Vessel activity is monitored in the vicinity of 12 state-managed MPAs;
- 375 square miles of California ocean waters are monitored;
- The system provides continuous coverage day and night;
- 110 M2 account holders have remote access to California M2 data streams.

eFINS and M2 data help CDFW and enforcement partners to:

- 1) Better understand human use in and around MPAs to plan future patrols.
- 2) Search historical data while on patrol, enhancing conservation and officer safety.
- 3) Use its high quality, geo-referenced database to understand trends in violations or activity, identify locations of key concern, and query data to understand human uses.
- 4) Facilitate wider agency coordination and collaboration. eFINS and M2 data are shared with USCG Sector Los Angeles/Long Beach to inform regional inter-agency enforcement briefings and contribute to enhanced overall marine domain awareness.

## Challenges

- Uptake and data entry are not consistent across CDFW patrol vessels outside the sanctuary region.
- M2 data viewer products are not consistently accessed and used by enforcement partners.
- Maintenance of both systems requires sustainable funding for equipment and staff.

## Knowledge Gaps and Recommendations

To improve awareness of and compliance CINMS will:

- Continue to collaborate with the state of California in the development of interpretive outreach products (e.g., printed materials, digital resources) and signs that target priority user groups.
- Cooperate with and support CDFW, NPS, USCG and NOAA's Office of Law Enforcement through support and development of eFINS, shore-based radar systems, and other enforcement data collection and tracking tools (to extent funding allows).
- Actively support and participate with the Island Sentinel cooperative enforcement group.

CDFW has limited ability to query geospatial information and access their own and other officers' data (like violation history) in an offshore marine environment. From field wardens to CDFW leadership there is limited ability to learn from historical enforcement data. We recommend CDFW's Law Enforcement Division (LED):

- Commit to expanded and consistent use of eFINS statewide, including sustainable funding for equipment and staff support.
- Merge historical eFINS, Record Management System and the electronic Daily Activity Reports to better understand enforcement activity and violation trends.
- Continue involvement in Island Sentinel Cooperative Enforcement Group, and expand this partnership model to other regions.

To ensure M2 data have a meaningful impact and inform the state's DMR, we suggest CDFW:

- Explore opportunities to establish new M2 systems.
- Work with RLF, CMSF, and ProtectedSeas to identify priority vessel hotspots and create a historical record and understanding of vessel traffic in MPAs of interest.
- Increase training to help wardens become more familiar with using the M2 Viewer to support real-time, boat and shore-based patrols.
- When vessel tracks indicate prolonged activity within MPAs, send M2 data to CDFW wardens to create real-time surveillance of on-the-water activity.