Kelp Restoration and Management Plan (KRMP) Development

12 November 2026

Presented to:

Marine Resources Committee

CA Fish and Game Commission

Presented by:

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Sr. Environmental Scientist Specialist

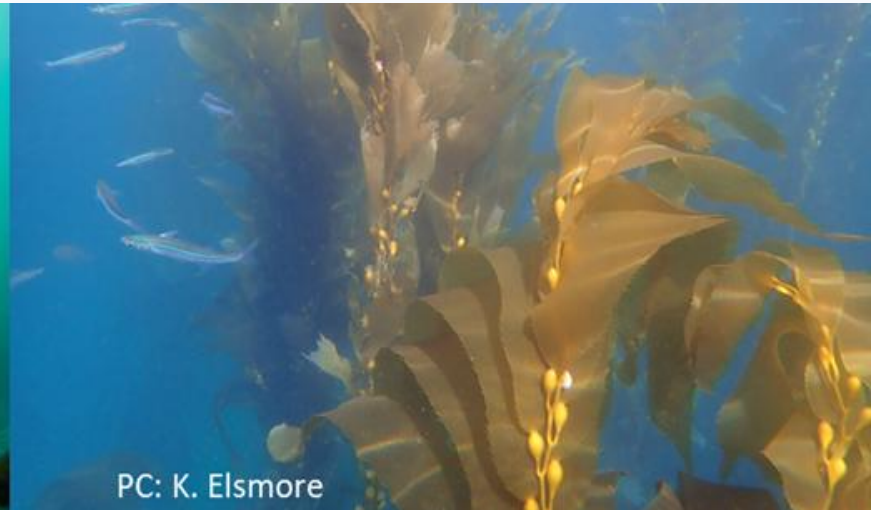
CDFW Marine Region

Overview

- Overview of draft Kelp Restoration and Management Plan (KRMP)
  - Development Process and Timeline
  - Draft Management Strategy
    - Harvest Framework
    - Restoration Framework



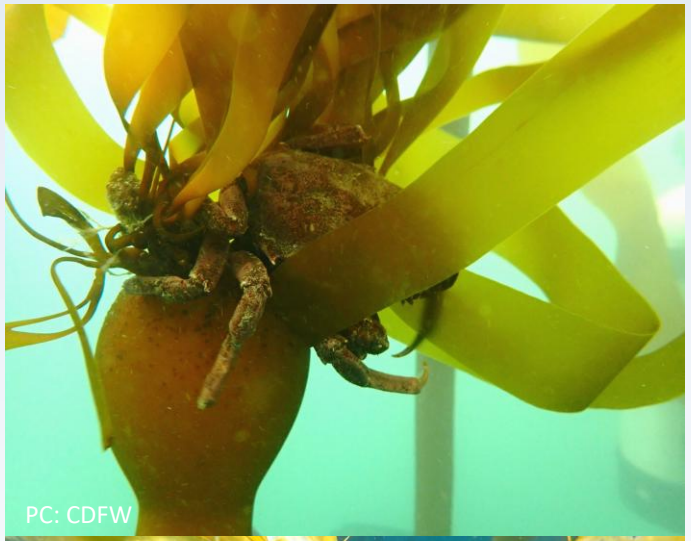


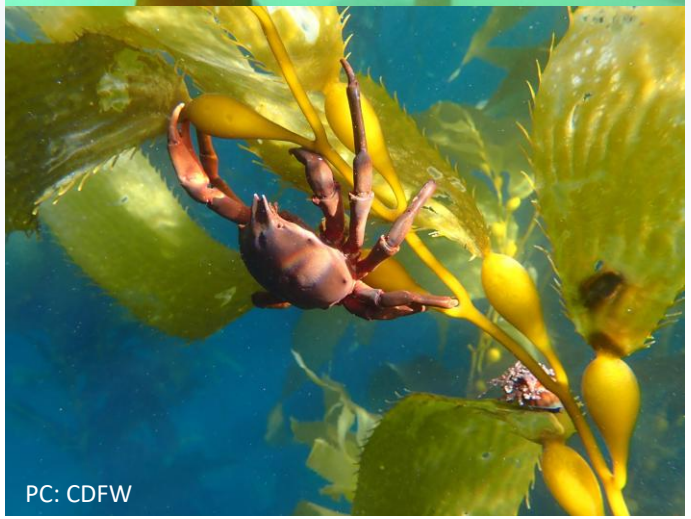


Kelp Restoration and Management Plan (KRMP)

- **Overarching Goal**: *To develop a robust, adaptive, climate-ready approach to managing, protecting, and restoring giant and bull kelp forest ecosystems statewide for consideration and adoption by the Fish and Game Commission*

- **Core Components**:
  - Overarching ecosystem-based management framework
  - Adaptive kelp harvest framework
  - Restoration toolkit


PC: CDFW


PC: CDFW

KRMP Development Approach

- **Tribal Engagement**
- Solicitation, establishment, and convening of **Community Working Group** (CWG)
- Establishment and convening of **Science Advisory Committee** (SAC)


PC: CDFW


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With Support from: StrategicEarth CONSULTING Sea Grant California

Where KRMP Has Been + Where It's Headed

2022

Funding Approved

2023 - 2026

Develop & Draft KRMP

- Tribal Engagement
- Community Working Group (CWG)*
- Science Advisory Committee (SAC)*

* There was representation on the CWG and SAC from CA Native American Tribes

2027

Review & Refinement of Draft KRMP

- Peer Review
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- Regular updates to the Fish and Game Commission (FGC) Tribal Committee and Marine Resources Committee (MRC)

- Present draft KRMP document & propose implementing regulations to the MRC

MRC to recommend package be forwarded to the Commission

2028 & Beyond

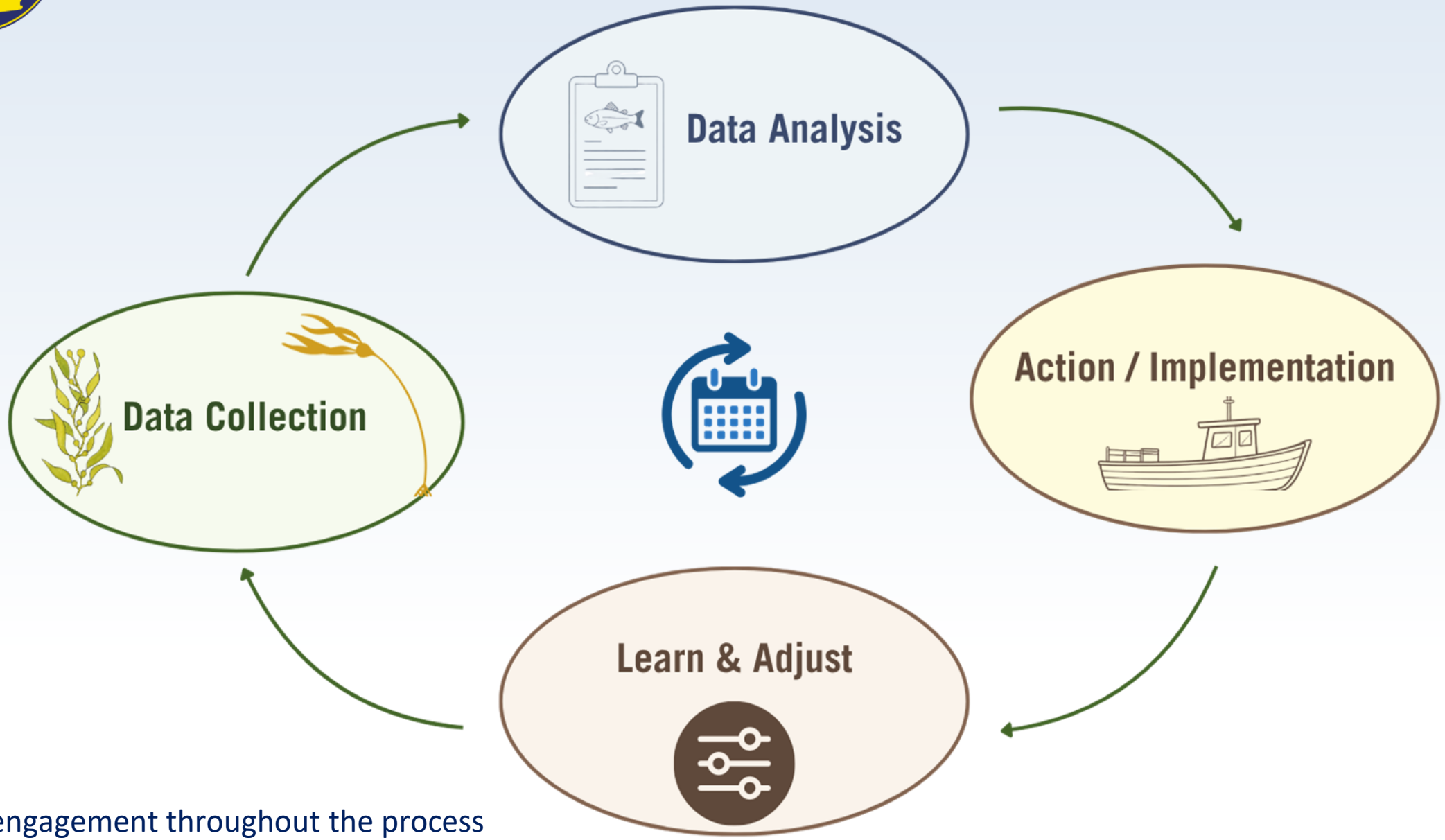
Fish and Game Commission Process

FGC Hearings:

- Notice Hearing
- Discussion Hearing
- Adoption Hearing

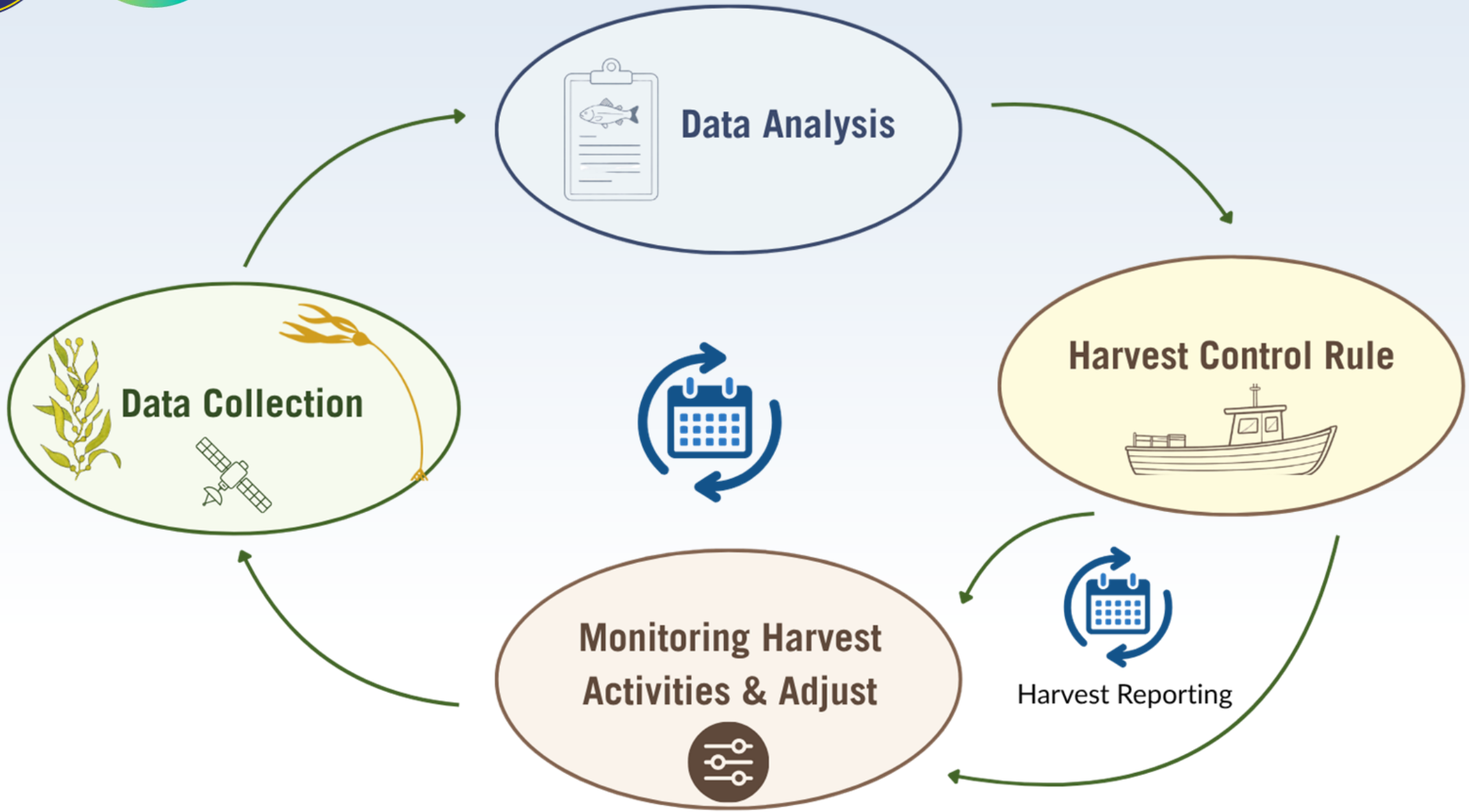
Adoption of KRMP & Implementing Regulations

KRMP Draft Management Strategy: Harvest & Restoration

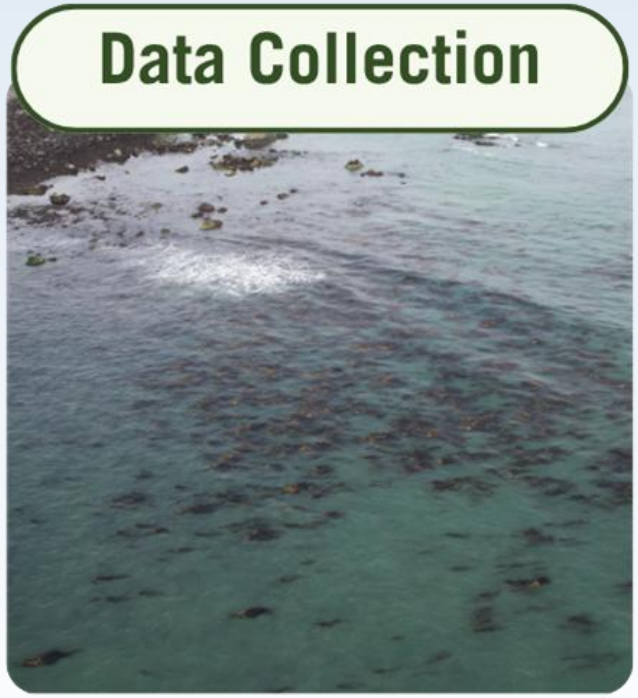


*Tribal engagement throughout the process

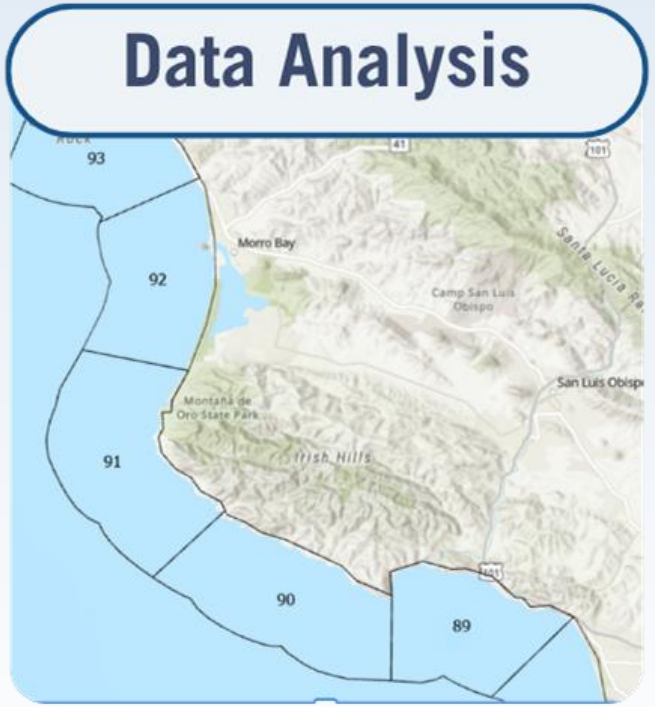
Draft Commercial Harvest Framework



Commercial Harvest: Data Collection & Analysis



PC: K.Kramer| WHOI



- Satellite-derived Data:
  - Landsat* - giant kelp
  - Sentinel-2 – bull kelp

- Quantify biomass:
  - within each Kelp Spatial Management Unit (KSMU)
  - for each species

*Flexibility to use Sentinel-2 for giant kelp in the future when sensor-specific biomass conversion factor developed

Commercial Harvest: Harvest Control Rule

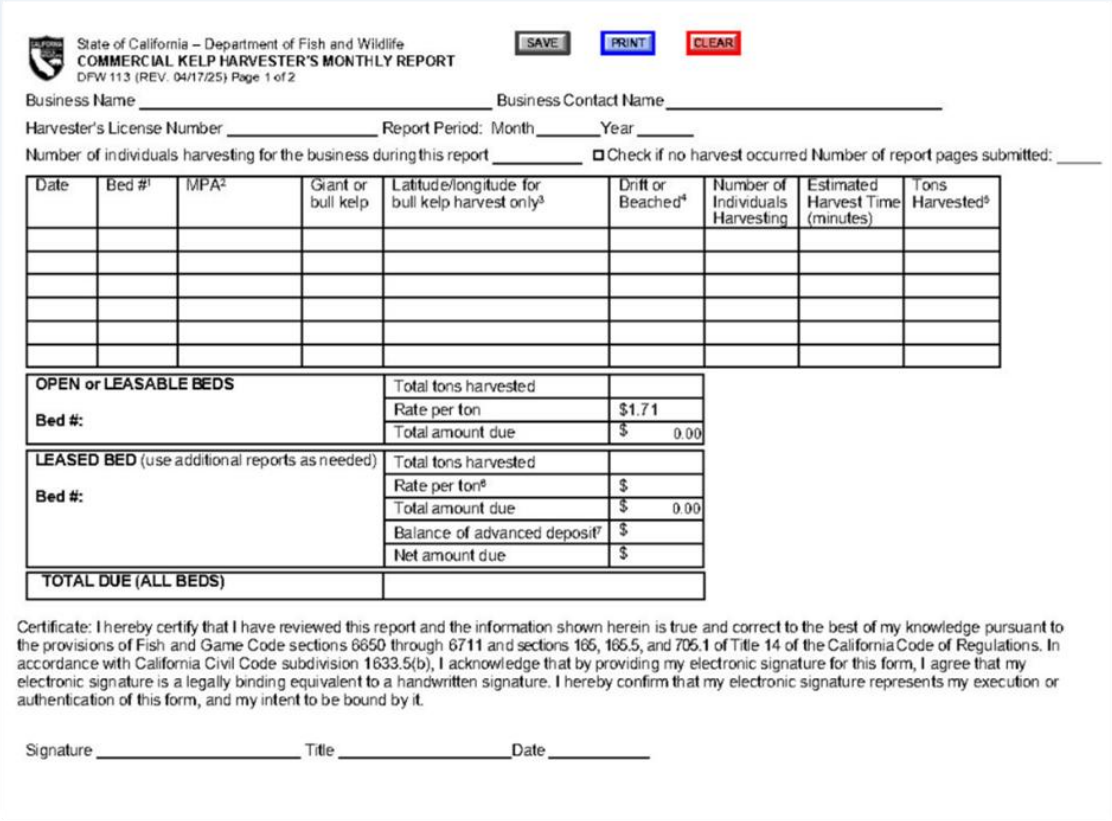


PC: K. Elsmore | CDFW

- Determine the annual quota:
  - by Kelp Spatial Management Unit
  - by species
  - Based on:
    - Total available biomass
    - % sustainable harvest
  - Re-evaluate every 3 years

Commercial Harvest: Monitor Harvest Activity & Adjust

Monitoring Harvest Activities & Adjust



State of California – Department of Fish and Wildlife
COMMERCIAL KELP HARVESTER'S MONTHLY REPORT
DFW 113 (REV. 04/17/25) Page 1 of 2

SAVE PRINT CLEAR

Business Name _____ Business Contact Name _____

Harvester's License Number _____ Report Period: Month _____ Year _____

Number of individuals harvesting for the business during this report _____ ☐ Check if no harvest occurred Number of report pages submitted: _____

Date	Bed #[1]	MPA[2]	Giant or bull kelp	Latitude/longitude for bull kelp harvest only[3]	Drift or Beached[4]	Number of Individuals Harvesting	Estimated Harvest Time (minutes)	Tons Harvested[5]

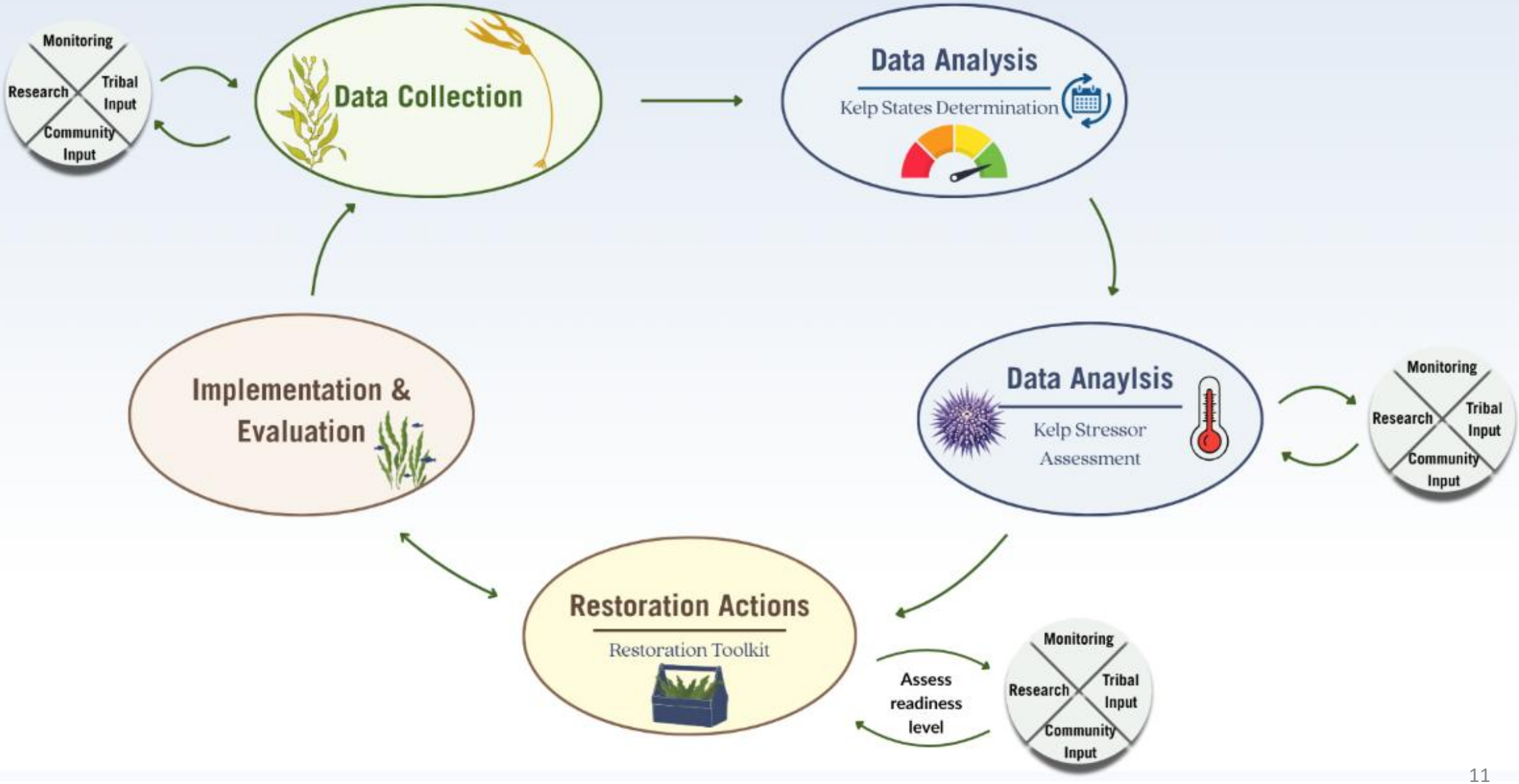
OPEN or LEASABLE BEDS	Total tons harvested	
Bed #:	Rate per ton	$1.71
	Total amount due	$ 0.00
LEASED BED (use additional reports as needed)	Total tons harvested	
Bed #:	Rate per ton[6]	$
	Total amount due	$ 0.00
	Balance of advanced deposit[7]	$
	Net amount due	$
TOTAL DUE (ALL BEDS)		

Certificate: I hereby certify that I have reviewed this report and the information shown herein is true and correct to the best of my knowledge pursuant to the provisions of Fish and Game Code sections 8650 through 8711 and sections 165, 165.5, and 705.1 of Title 14 of the California Code of Regulations. In accordance with California Civil Code subdivision 1633.5(b), I acknowledge that by providing my electronic signature for this form, I agree that my electronic signature is a legally binding equivalent to a handwritten signature. I hereby confirm that my electronic signature represents my execution or authentication of this form, and my intent to be bound by it.

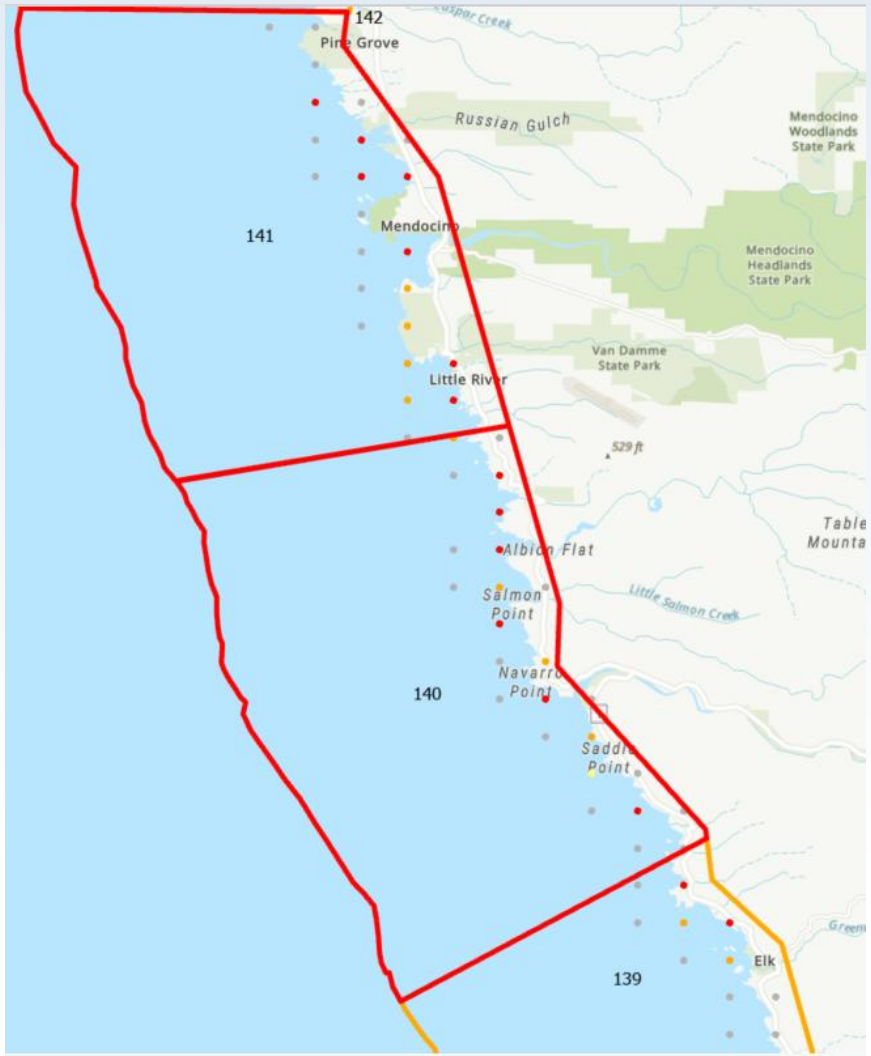
Signature _____ Title _____ Date _____

- Industry-reported harvest data will be used to monitor the amount of commercial harvest in relation to the annual quota.
  - Commercial kelp harvest reporting
  - Evaluate total harvest
  - Implement in-season action if necessary

Draft Restoration Framework



Restoration - Data Collection & Analysis: Kelp States



- Determine Kelp State every 3 years
- Kelp canopy cover relative to baseline
  - Statewide remote-sensing satellite data
  - Baseline time-period: 1984-2013*
- Evaluated at two spatial scales:
  - 1-km cells
  - Kelp Spatial Management Units (~10-km)
- Kelp States:

Depleted Decline is substantial, persistent, and widespread
Compromised cover has declined and recovery might not occur or further decline may occur
Fine/Likely Persistent Cover has declined but may recover naturally
Thriving/Persistent Cover is high, persistent, and widespread
Ephemeral Cover is temporally patchy and considered ephemeral

Restoration - Data Analysis: Kelp Stressor Assessment

1 Identify Stressor(s)

KELP STRESSORS

- OCEANOGRAPHIC CONDITIONS
- CONNECTIVITY AND DISPERSAL
- GRAZING PRESSURE
- COMPETITION
- SEDIMENTATION
- OTHER

- Use existing data
- Identify & fill data gaps
- Implement research & monitoring, as needed
- Support from Tribes and community

2 Match stressor(s) to the appropriate tool(s)



OR

No Restoration

- No restoration. Continued monitoring & research

Restoration - Actions: Potential Restoration Options



Grazing Pressure Management

- Remove grazers
- Move grazers
- Modify grazing behavior via
  - dietary supplementation
  - predator enhancement
  - predator management

Kelp Supply/Availability Management

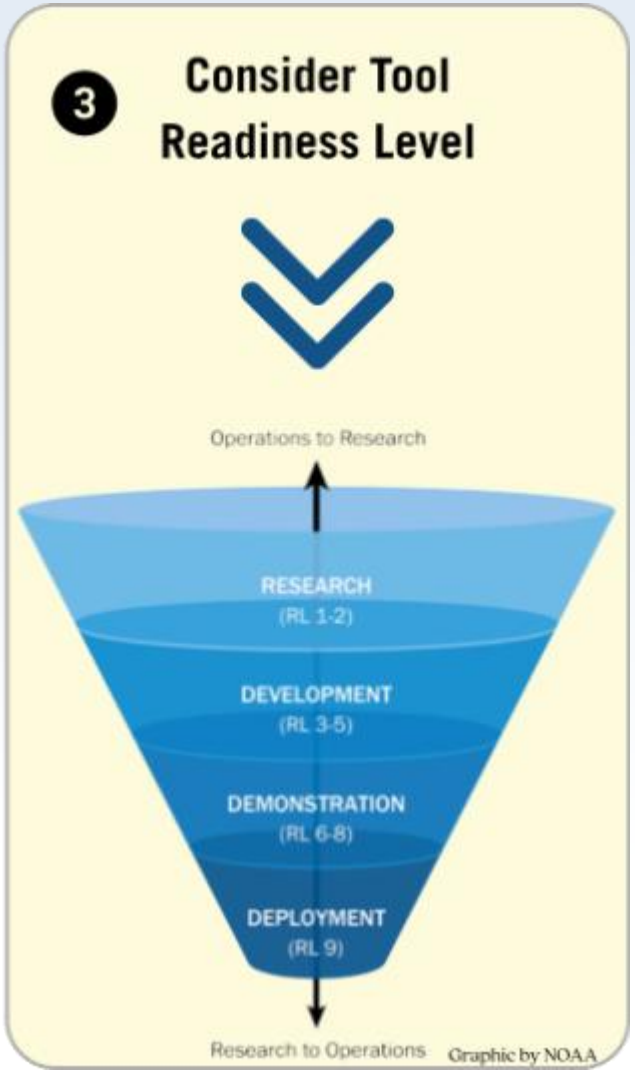
- Move or relocate kelp adults and/or propagules
- Enhance kelp adults and/or propagules
- Build physiological thermal resilience
- Build genetic thermal resilience
- Build & maintain a biobank

Non-Native Species Competition Management

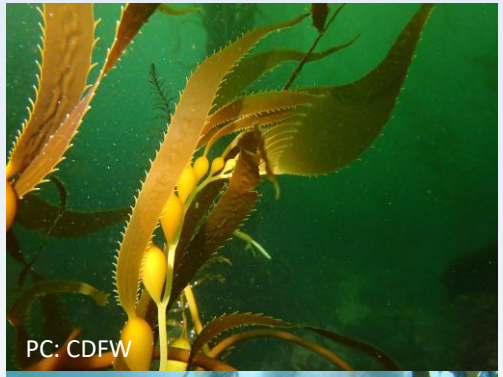
- Remove non-native species

Viable Habitat Availability

- Address abiotic factors; supplement settlement substrate



Restoration - Implementation & Evaluation


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Implementation

- **Pathways** for projects:
  - Scientific Collecting Permit
  - Restoration Management Permit
- **Coordination with other CDFW management programs** (e.g., California Artificial Reef Program, Marine Protected Areas)
- **Collaboration with partners** (e.g., Tribal, community, academic, others)



*Conceptual illustration for presentation purposes only

Evaluation

- Continued **review and evaluation** of restoration efforts
  - Update the restoration toolkit as new information becomes available
- **Learning translated into decision-making**

Community Input


PC: CDFW


PC: G. Downie


PC: CDFW

- Community Input Tool
  - For the public to share observations and inform management decisions
  - Help raise the alarm
  - Highlight signs of recovery
  - Supplement traditional monitoring tools



Looking Ahead

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Thank You

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