

Puget Sound Kelp
Conservation and
Recovery Plan Workshop

February 28, 2019

Flip Chart Notes

Breakout Session #1

Discussion question: What are possible short term and long term actions/strategies that can help address the data gaps (physical stressors, biological stressors, human impacts)?

Group 1- Flip chart notes

Actions/Strategies

Group 1
1st breakout

- ✓ Monitoring Temp. (doing a better job) P ✓
- Monitoring broader range of Physical Stressors P
- Standardize timing
- ≠ Longer-term monitoring - Index sites (ALL) P
- Gather data understory B
- ✓ Grazers - Monitoring B
- eDNA - studying (and isotope) B

Actions cont

Group 1

- Look at other protocols
(Norway, California) (ALL)

- Study smaller samples to
identify stressors (P)

✓ Kelp Crab recruitment study
(B)

✗ Trash - Dealing with trash in
nearby community /
derelict gear caught in kelp (HI)

- Looking at connections to kelp
and land use (HI)

Actions

Group 1

Physical Stressors Actions (P)

- Research project on sediment ✓

- Light?

- changes?

- Mapping - change over time

- Turbidity - Measuring ✓

- Measuring light, nutrients, etc.

Top Four

✓ Light ✓

✓ Turbidity ✓

✓ Nutrients / salinity

✓ Temp ✓

Group 2- Flip chart notes

SHORT & Long-term ACTIONS/STRATEGIES that can help Address DATA GAPS.

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PHYSICAL STRESSORS (P) BIOLOGICAL STRESSORS (B) HUMAN IMPACTS (HI)

PHYSICAL STRESSORS

Temp. → NOAA DATA: Temp MONITORS - BULB, MID. STIPE, BOTTOM (P)

~~SEDIMENT~~ → Large Scale DATA AVAIL.; Focus on FINE SCALE

SALINUS Ecosystem MODELS exist for H₂O quality.

- Is this DATA suitable for our NEEDS (P)

- Investigate ^{CONCENTRATIONS AT} LOCATIONS in DECLINE (P)(B)(HI)

✓ - NUTRIENT MONITORING in H₂O (B)(P)

✓ - NUTRIENT MONITORING in KELP TISSUE (B)(P)

✓ - TROPHIC INTERACTIONS - DIET DATA FROM FISH WHICH eat GRAZERS (B)
THROUGHOUT SOUND

- SYNTHESIZE AVAIL. TEMP DATA SETS (P)

✓ - STRONG NUTRIENT OUTFLOW RELATIONSHIP TO KELP (P)(HI)

✓ - Roles of PATHOGENS/DISEASE (B)

✓ - Role of beneficial MICROBIAL COMMUNITIES (B)

✓ - COMPETITIVE INTERACTIONS btw. KELP SPECIES (B)

- MAPPING UNDERSTORY

✓ - BOATING IMPACTS (HI)

✓ - HARVESTING IMPACTS (HI)

Human → Shoreline dev. / Pollution

- Nutrient Forum (Ecology) looking at ~~water~~ urbanization impacts on water quality

Biological/Physical

- Understand The variation (What's Normal?)
- Have The disturbance Regimes changed?
- What are The top down controls of stressors (sea urchins) (Gastropods etc.)
- Substrate changes
- Some Bed ↑ some ↓, What is The difference? What makes The ↑ Beds successful?

→ ~~what~~ Bring together "grass roots" knowledge find out what exists. (including ongoing monitoring of Biot./Phys. trends)

- What Biological factors have come/gone over last 100 years (fish etc.)

- Need to know impact of Temperature on Gametophytes
- When Does reproduction happen?

- Surface Temps in Rivers / Frazier sedimentation
 sea level rise → How does climate change impact kelp or potentially increase

→ What is The history of Temperature Regimes in P.S.

- Temperature has The Best data set

arrange a Monitoring campaign
 select some protocols to expand to

Group 3- Flip chart notes

- Harvest (DFW has 20 year set of Data)
Needs More Understanding
 - What's The Biological role of wrack and The impact of wrack harvest
 - Research should be prioritized Based on what Managers can act on
 - Traditional Ecological Knowledge (Dist/~~Hot~~^{Study})
 - Physical/Biological Monitoring
 - Link known changes in Biol./Phys. Stressors to known Distribution changes
- (3)
regulations need addressing as well
Same w/ water quality

Group 4

ACTIONS

①

✓ LIFE STAGE VULNERABILITY

↳ DNE SURVEYS / OBSERVATIONS

- Grad students

- NOAA VET CORPS

• MONITORING OF RECREATIONAL HARVEST - SELECT LOCATIONS H1

- Waldron, Whidbey

- Developing regulations
harvest instructions

WDFW

- DNR Harvest study
control plots

• PROTOCOLS FOR NO-NET LOSS

- ID dept staff for monitoring &

- Helen & Cindy review Norway protocols

- Expand regulatory protections to specify help

Group 4

(2)

ACTIONS

- MONITOR OUTFALL DISCHARGE & NUTRIENT ^{HI}
 - SAV community ^{LOADING}
 - Macro invertebrates/densities
- TEMPERATURE TOLERANCE
 - ID persistent kelp
 - live ocean ^{PMNL model} - ID local temp hotspots ^{concrete w/ die offs}
- DA FISH USE IN UNDERSTORY KELP
 - DR Study - cameras / test plot
 - USE EXISTING TOWED VIDEO
- USE MODEL DATA FOR SITE SELECTION ^{ID kelp & fish}
 - Plume dispersion - ^{sampling} design
- STANDARD MONITORING PROTOCOL
 - NEED lead coordinating regional monitoring plan

Breakout Session #2

Discussion question: What are possible short term and long term actions/strategies that can help address the data gaps (distributions and trends, priority areas, restoration)?

Group 1- Flip chart notes

Actions ~~cont.~~ #1

Group 1
Breakout 2

- ✓ Aerial photography w/ Grand Gulch ^{DT}
 - Expanding areas
 - Digitizing the data
 - Standardize Methods (drones)
 - Recreational kayaks ^{DFW?}
- * Historical data mining ^{DT}
 - Fishermen, stakeholders
 - Combine w/ emerging data
 - Student thesis
- Substrate distribution trends ^{PA}
would feed into help priority areas
- Linking connections to key species
in "telling the story"

Actions Cont. #2

Group 1

- Use areas of recruitment to advise PA & PA
- ✓ Make a list of criteria to identify priority areas. PA
- Coordinate with current vegetative monitoring efforts to attract support/funding PA & R
- ✓ Fish use data for ~~used~~ all kelp targeted to species of concern. PA & R
- Sourcing dynamics
- Hydrodynamic modeling
- Incorporate protection into plan PA
- ~~Deep~~ Experimental kelp production (in lab) R

Actions cont. #3

✓ Criteria for "Priority Areas" PA

- ~~Source~~ dynamics
Source/sync
- Enviro. Cond. specific to help
- Linking w/ species of interest
- Climate change factors

✓ Working w/ Historical data DT

- Identify if restoration is needed R

✓ Expand on historical/past efforts
by incorporating new methods (apps, drones) R

- Rename to "management Plan"

- Consider invasive species R
Control in restoration

Group 2- Flip chart notes

GROUP 2
SECT. 2

DISTRIBUTION & TRENDS (DT) PRIORITY AREAS (PA) RESTORATION (R)

DISTRIBUTION & TRENDS

- STUDY GENETIC DIFF. DISTRIBUTION
 - FINE SCALE GENETIC DIFF (DT)
& RELATION TO RESTORATION NEEDS (DT) (R)
- UNDERSTANDING PLATEAUIC DIST. (DT) (R)
- BETTER UNDERSTANDING of long-term (DT)
trends of UNDERSTORY US. CANOPY
- inclusion of thriving AREAS
- IDENTIFY HABITAT AVAILABILITY & SUITABILITY (DT) (PA)
~~BELEK~~ PRIORITY AREAS (DT) (PA)
- DEVELOP CRITERIA for PRIORITY AREAS (PA)
 - CONSERVATION vs. RESTORATION
- ✓ STRATEGY to implement PROTECTION AREAS (M)
- ✓ IDENTIFY DISTRIBUTION of UNDERSTORY (PA)
 - AS spp. SPECIFIC AS POSSIBLE

RESTORATION

- BMPs for restoration methods (R)
- DEVELOP STRAINS WARM H₂O TOLERANT (R)
OR FWD
- IS NEARBY SUBSTRATE A LIMITING FACTORS (R)

Breakout Session 2

Group 3

① Need Multiple Strategies for Monitoring (Diving, Aerial, ^{Kayak} On The Water, Satellites)
Specific problems with Drones etc
But could be useful at specific sites (weather is an issue)

→ Nest the Data

Diving is critical (Best But Most expensive)

✓ ② Implement ground Truthing for Distribution/Trends Monitoring.

③ Link this to Biological/Physical factors (Distribution)

✓ ④ Need to look at Species (finer scale data) link it to Distribution/Trends

✓ ⑤ Need More Monitoring of NON-canopy (limited by methodology → camera tow/diving)

✓ ⑥ Prioritize areas for subtidal species trends based on where canopy kelp has changed (Assess subtidal kelp in places where canopy kelp has changed)

⑦ Instead of prioritizing sites, we need to know ~~what~~ ^{where} people are already monitoring trends and coordinate across organizations/people (Collaborate)

Breakout session 2

⑧ Act opportunistically with the resources you have.

⑨ Protecting kelp requires Best available science and Best available science Doesn't exist. Especially around Human Impacts (structures etc.)
Need Science

⑩ Need to implement the protections that already exist on paper

⑪ EDUCATE DECISION MAKERS and THE PUBLIC

⑫ Need more Genetics Data before ~~Restoration~~ Restoration Action

⑬ Define Restoration, Maybe it's Restoring another Biological System or Species to Bring kelp back.

⑭ Look at Low hanging fruit to implement Restoration (water quality, fisheries Regs etc).

⑮ Remove Sargassum to Restore kelp (only thing known to work)

Group 4

ACTIONS - DISTRIBUTION

①

✓ MAP OF HISTORIC DISTRIB.

- NEED BASE LAYER
Central + north Sound

IDENTIFY PRIORITY RESTORATION SITES

- ARE RESTORATION SITES SUCCESSFUL?

CONSERVATION

- Reduce all stressors as much as possible
- ✓ - Criteria for conserving specific beds
 - isolated beds
 - Identify beds exposed to high stress
 - rank stressors
 - sites protected/well mixed T.

Group 4

ACTIONS

- Distribution

(2)

SOCIAL SURVEY - managers/
public
non native kelp - (Long range)

∞ WHAT FISH ARE WHERE + WHEN

- contributes to priority beds to conserve

- Focus on salmon + kelp
- sports fishing database?

- - anecdotal data

- standard protocol / survey

- volunteers fishing observ.

COMMUNICATIONS STRATEGY

- VIDEOS

- HISTORIC MAPS

Group 4 - Distribution (3)

DISTRIBUTIONS ACTIONS

AVR MAPPING METHODS

- Blue/Green LiDAR?
- Remote sensing

DATA HOUSING/CENTRAL

- DISCO model

✓ MRCs + Partners

- Kayaks + pilots

DATA DEVELOP DRONE PROTOCOL

- link w/ MRC kayak data

✓ Remote sensing

- need universities

✓ MULTIBEAM - UNDERSTORY P/A

- Gary Green > DNR, ECR, NOAA

✓ COASTAL ATLAS

- 2016 photos helpful for P/A

Group 4-
Flip chart
notes

Group 4 (4)

ACTIONS TRENDS

SAMPLING DESIGN + PROTOCOLS
FOR TRENDS MONITORING + QA/QC

- long term change vs natural variability. Similar to eelgrass

→ Kelp Health

- more than P/A

PRIORITY AREAS Restoration

Remove Sargassum • (1)

Voting Activity
Results

Population genetics/strain development
(tolerant kelp seeds) • (10)

BMP for restoration methods • (10)

Criteria for restoration sites •
substrate/historical presence/wq (6)


PRIORITY AREAS For CONSERVATION


(7) Develop Criteria for Priority Areas


~~(12)~~ (13) (14)
Fish use of kelp habitat

~~(12)~~ (13)
Expand monitoring of existing
Beds and exposure to stress

DISTRIBUTION

Identify distribution/trends
of understory species  (12)
longterm/shortterm

Historic / TEK Data mining  (11)

Aerial photography/ground truthing  (2)


Develop protocols  (15)
- Diving
- Drones
- Kayak
- Norway
- Understory (multibeam)


Data repository

Voting Activity
Results

~~HARVEST~~ HUMAN IMPACTS

BOATING

HARVEST (kelp)  (3)

Connections w/ LAND USE  (7)

TRASH / DERELICT GEAR / OTHER MARINE DEBRIS

Water Quality  (12)

Harvest (fish)  (1)

Voting Activity Results

PHYSICAL STRESSORS

SPATIAL TEMP (GEOGRAPHIC)

★★ Temporal Temp (SEASONAL & multi-year) (5)

★ H₂O Column Temp (3)

SEDIMENT ~~TEMP~~ (TURBIDITY & SUBSTRATE VARIANCE) (2)

★★ NUTRIENT MONITORING (IMPLICATIONS TO KEEP)
- IN H₂O & KEEP TISSUE (8)

★ Light (1)

BIOLOGICAL

★ GRAZER IMPACTS (1)

TROPHIC INTERACTIONS (FOOD WEB) (10)

★ LIFE STAGE VULNERABILITY (3)

★★ COMPETITIVE INTERACTIONS btw KEEP SPP (3)

PATHOGENS & DISEASE

MICROBIAL COMMUNITIES (Beneficial, Harmful...)