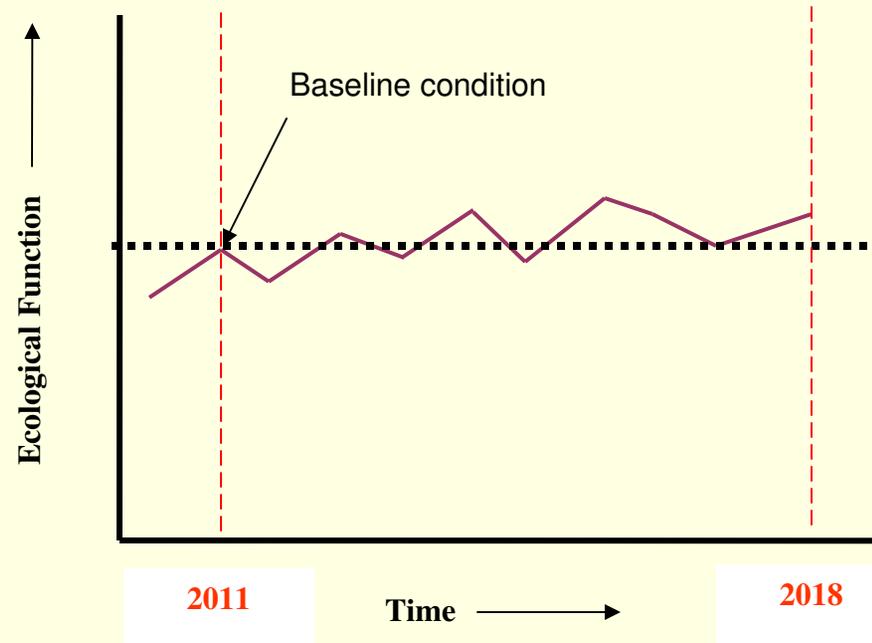


No Net Loss Framework

SMP tools for measuring and maintaining
ecological functions

What does **no net loss** mean?

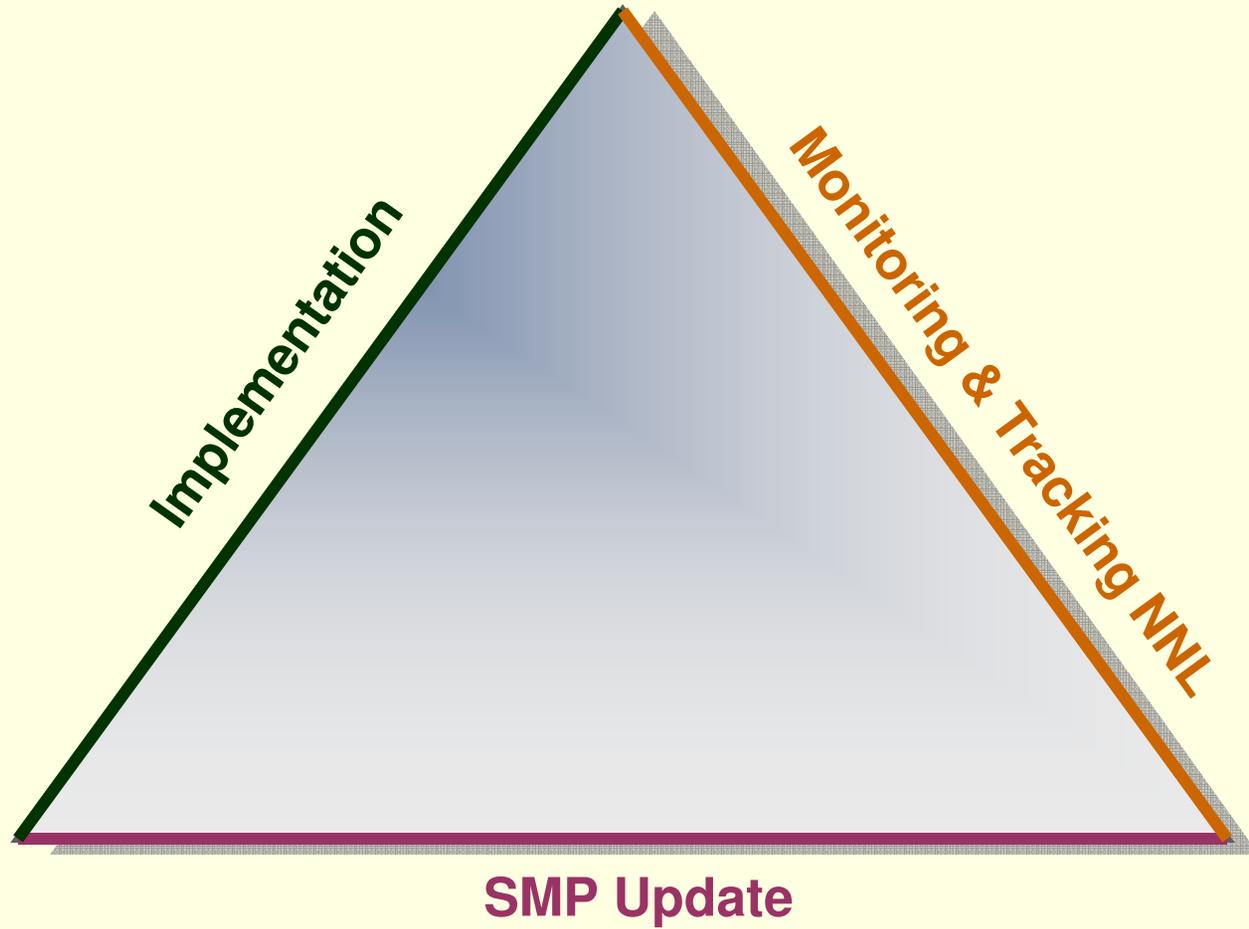
As shoreline development occurs, ecological functions stay the same (or are improved) over time



What's a framework?

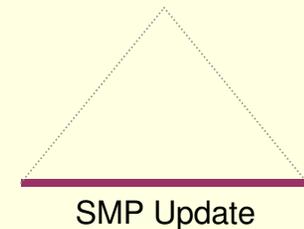
- A support structure
- A set of assumptions, concepts, values, and practices that constitutes a way of viewing reality
- A well defined tactic used to master the complex environment of an organization with simplicity
- A basic conceptual structure to allow homogenous handling of different objects

NNL framework

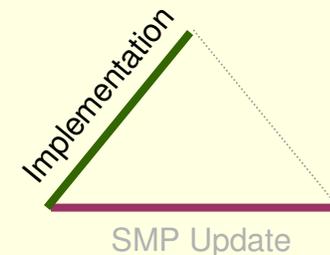


Goals of the NNL framework

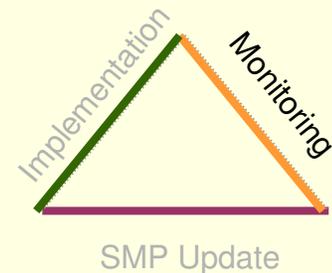
Provide a systematic way quantitatively relate SMP management decisions to functions



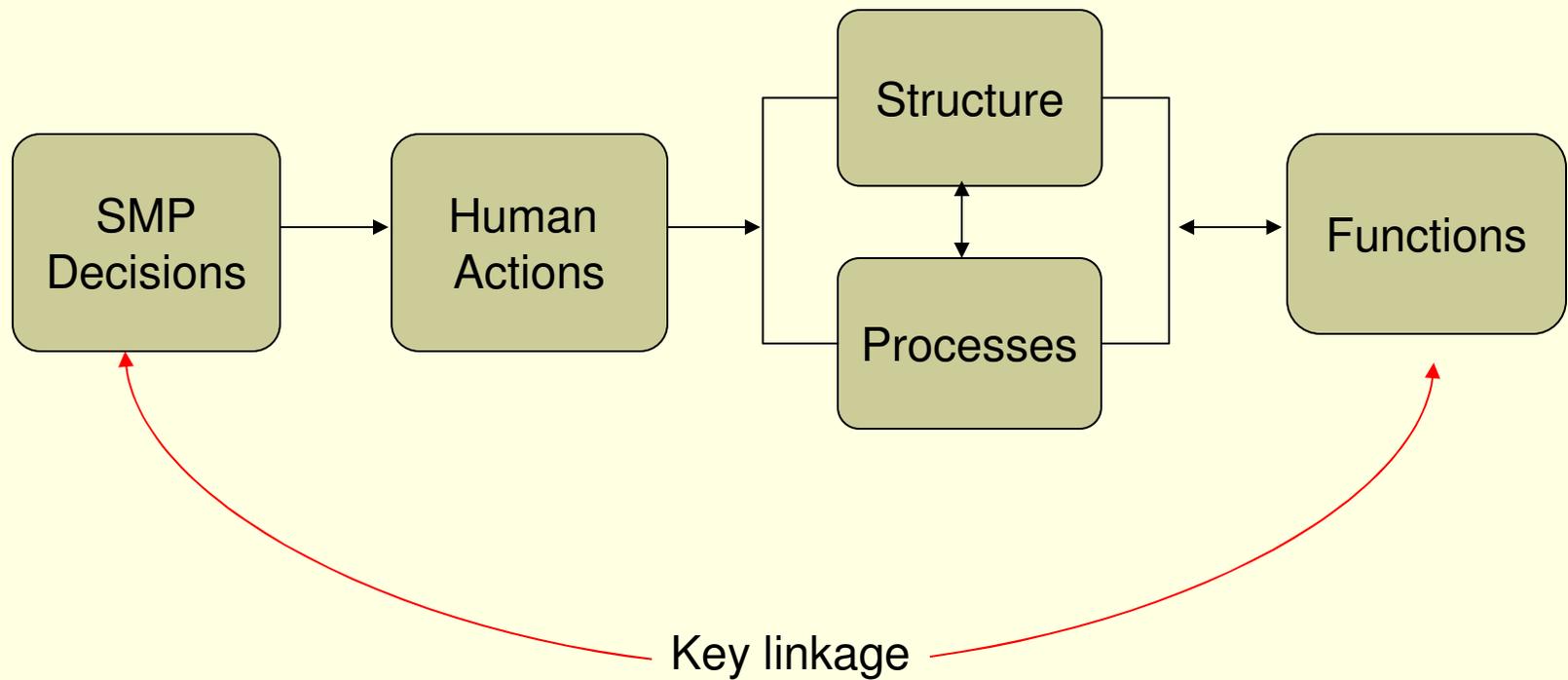
Provide site- and reach-specific information to support permitting and enhance technical support



Enable quantitative and spatially explicit monitoring and assessment to document NNL over time

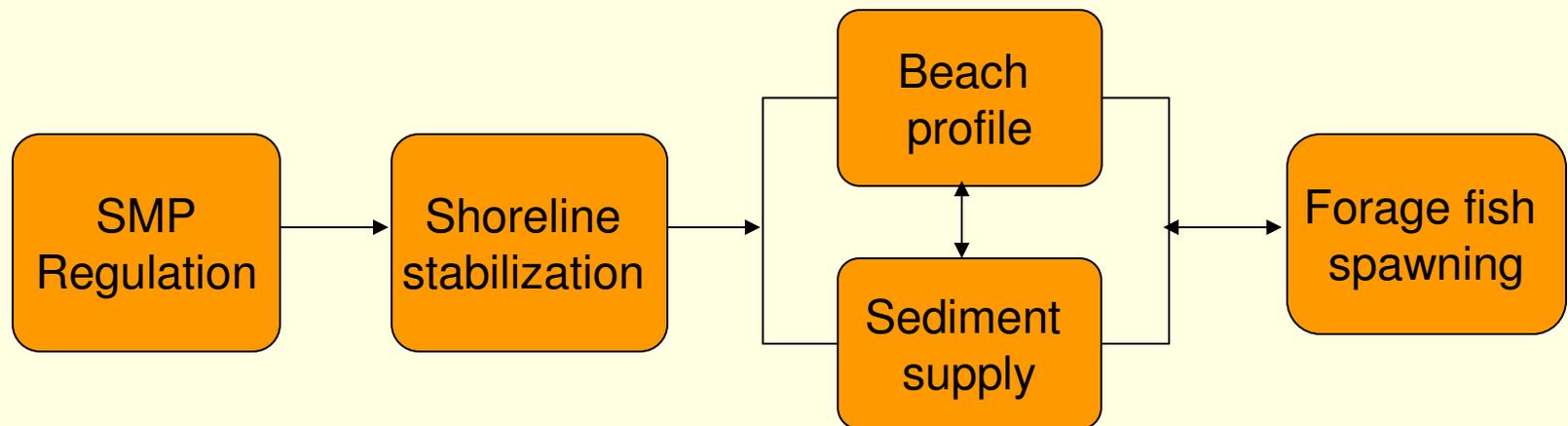


Conceptual model

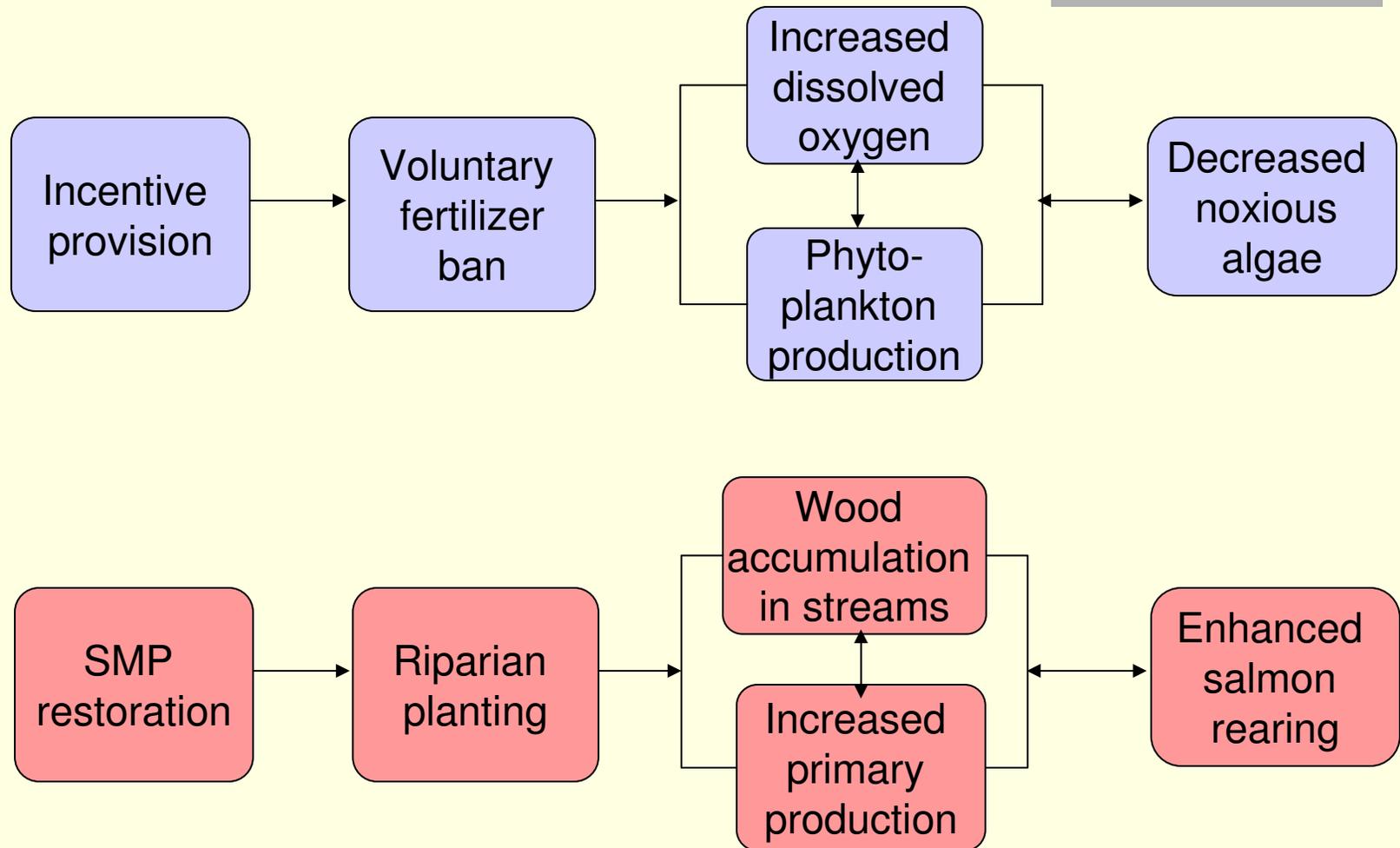


*adapted from Diefenderfer et al., 2009

Conceptual model



Conceptual model



*adapted from PSNERP 2009

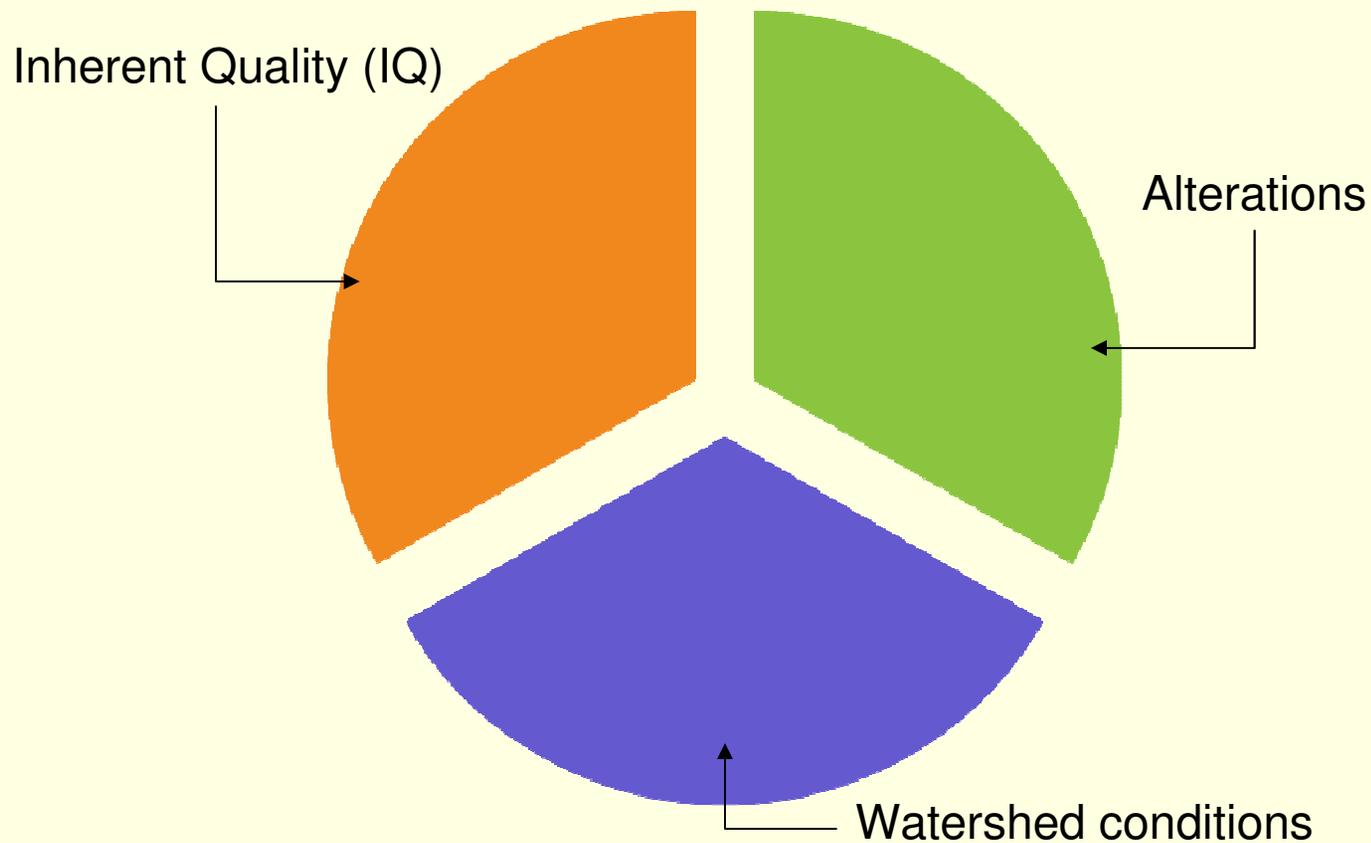
As a starting point...

We need a systematic, transparent and repeatable way to identify & document the connections between SMP decision and effects on functions

Using the framework - SMP updates

1. Document baseline ecological conditions (using indicators)
2. Evaluate potential land use changes
3. Determine risk of functional loss
4. Tailor SMP standards based on type and level of risk

Baseline conditions



*adapted from May and Peterson 2003

Indicators

Inherent quality (IQ):

1. Affected by factors such as location, shore type, etc
2. Presence / absence of:
 - eelgrass
 - kelp
 - forage fish
 - wetlands
 - feeder bluffs
 - proximity to natal streams, etc...

Indicators

Degree of alteration:

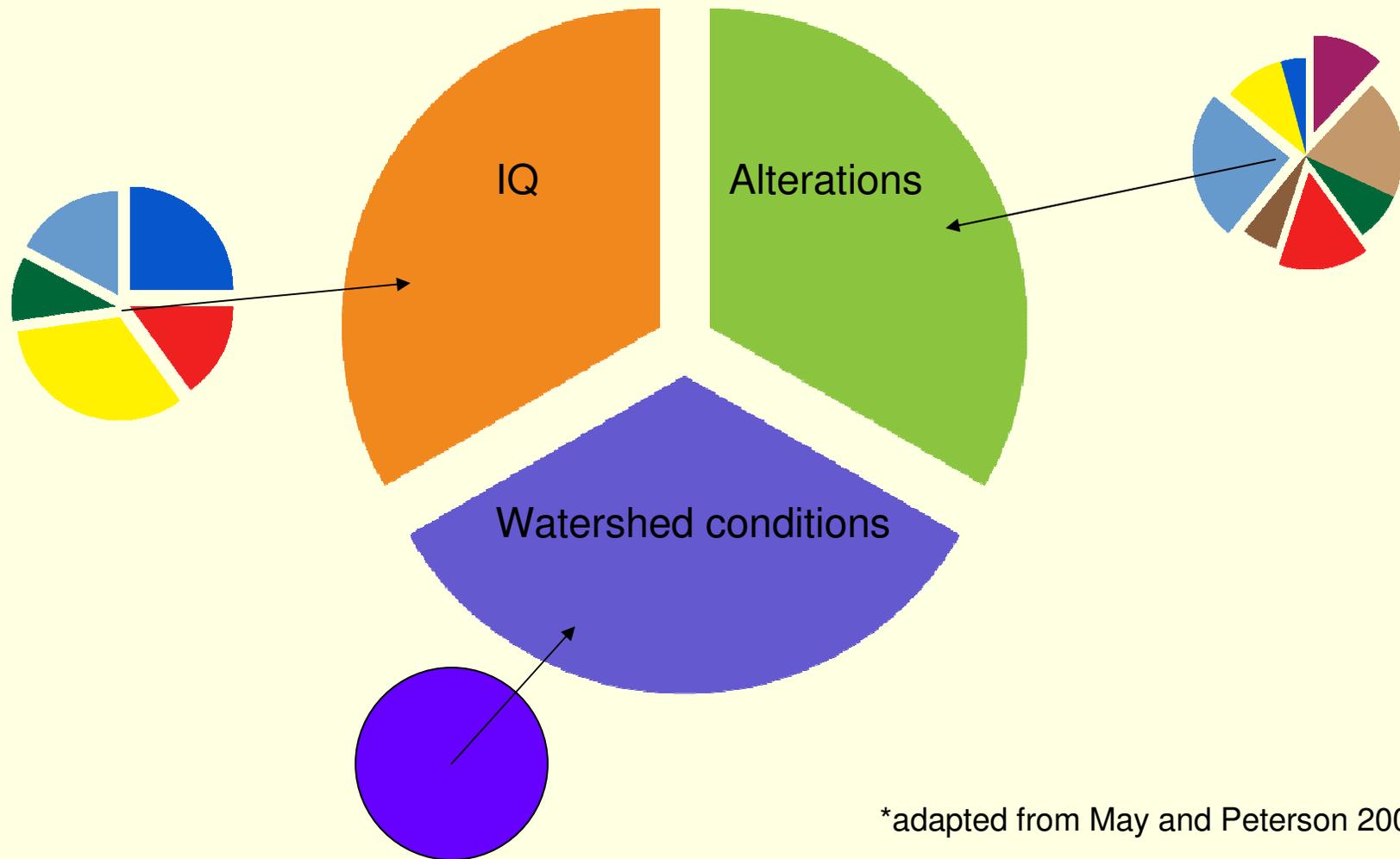
1. Affected by past development practices
2. Presence / absence of:
 - loss of forest cover
 - docks & piers
 - armoring
 - restricted shellfish harvest
 - confined floodplain, etc...

Indicators

Watershed condition:

1. Relative sub-basin rating from Ecology's characterization and/or PSNERP data

Baseline conditions

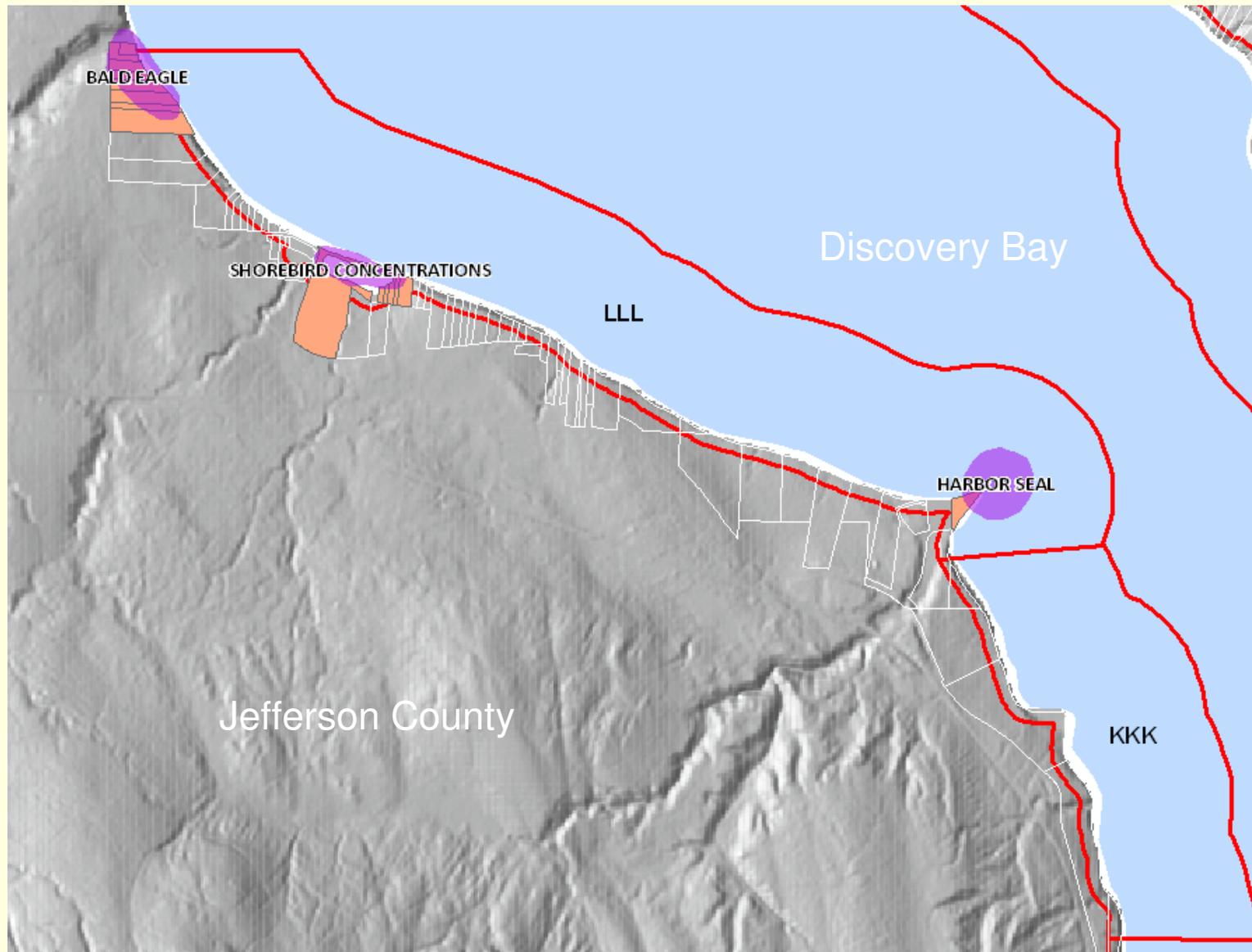


*adapted from May and Peterson 2003

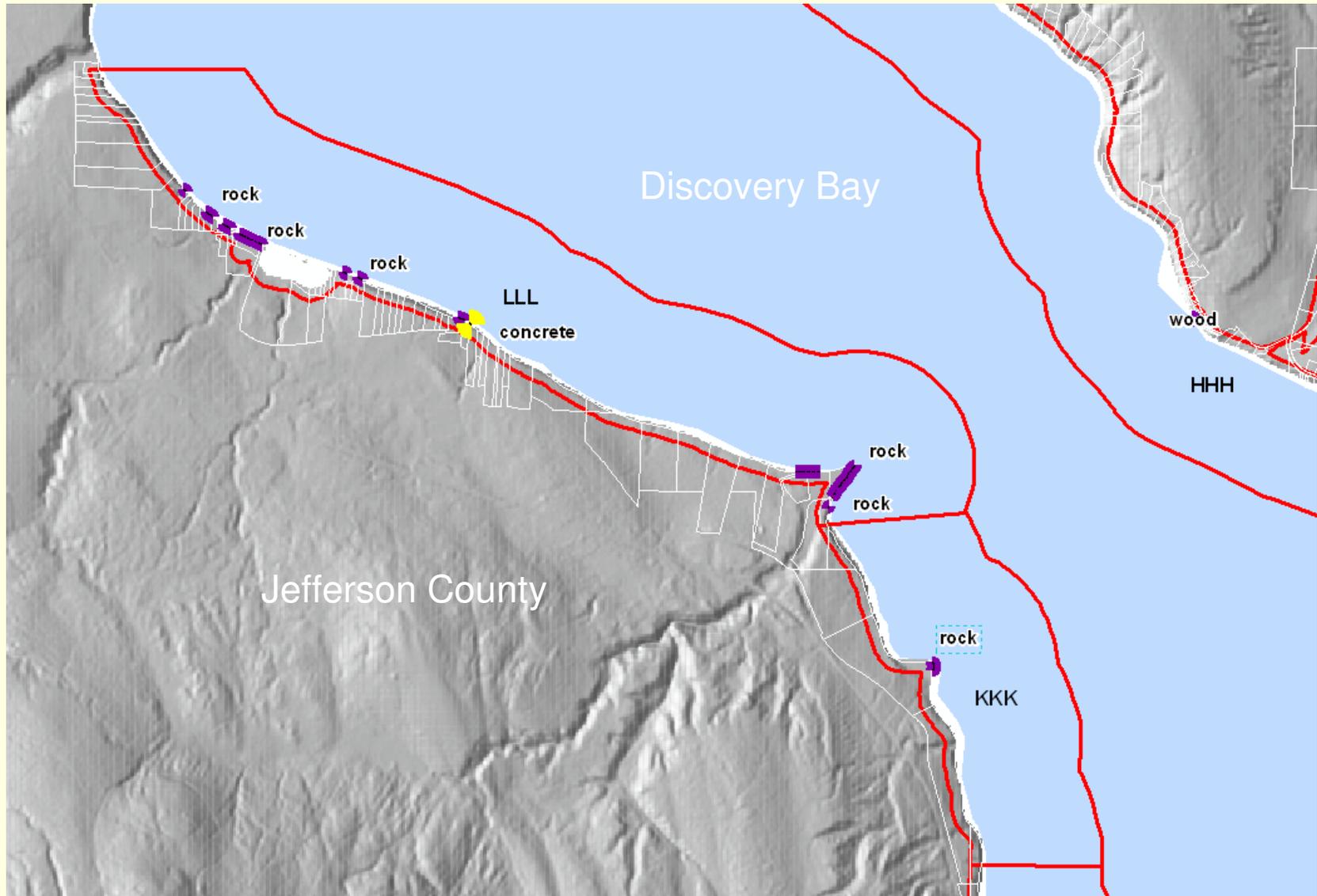
Jefferson Co. | Clallam Co.



IQ Indicator: Priority Habitats & Species



Alteration Indicator: Armoring

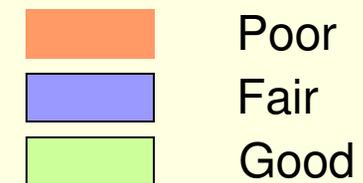
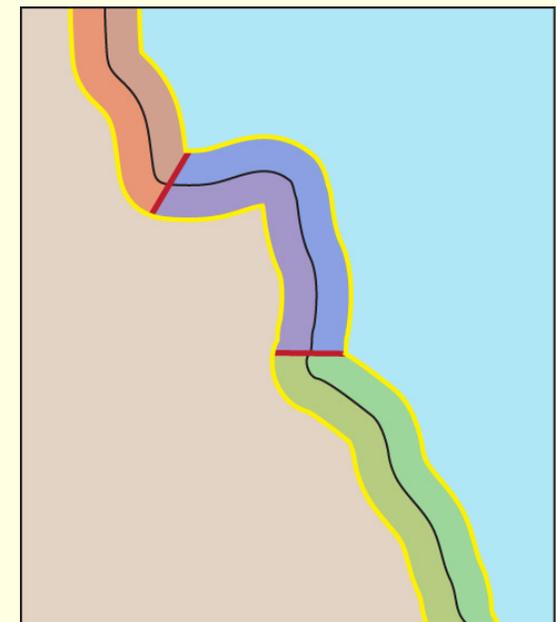


Results for step 1

| | | IQ Indicator | | | |
|-------|--------|--------------|--------------|-----|-------------|
| Reach | Parcel | Eelgrass | Feeder Bluff | PHS | Total score |
| A | 1 | | ✓ | | # |
| | 2 | | | ✓ | |
| | 3 | ✓ | ✓ | | |
| | 4 | | | | |
| | 5 | | | ✓ | |
| B | 1 | | | | |
| | 2 | ✓ | ✓ | ✓ | |

| | | Alteration Indicator | | | |
|-------|--------|----------------------|------|----------------|-------------|
| Reach | Parcel | Bulkhead | Dock | Lack of Forest | Total score |
| A | 1 | | ✓ | | # |
| | 2 | ✓ | | | |
| | 3 | | ✓ | | |
| | 4 | | | ✓ | |
| | 5 | ✓ | ✓ | | |
| B | 1 | | | | |
| | 2 | ✓ | ✓ | | |

Baseline Condition



Potential land use changes

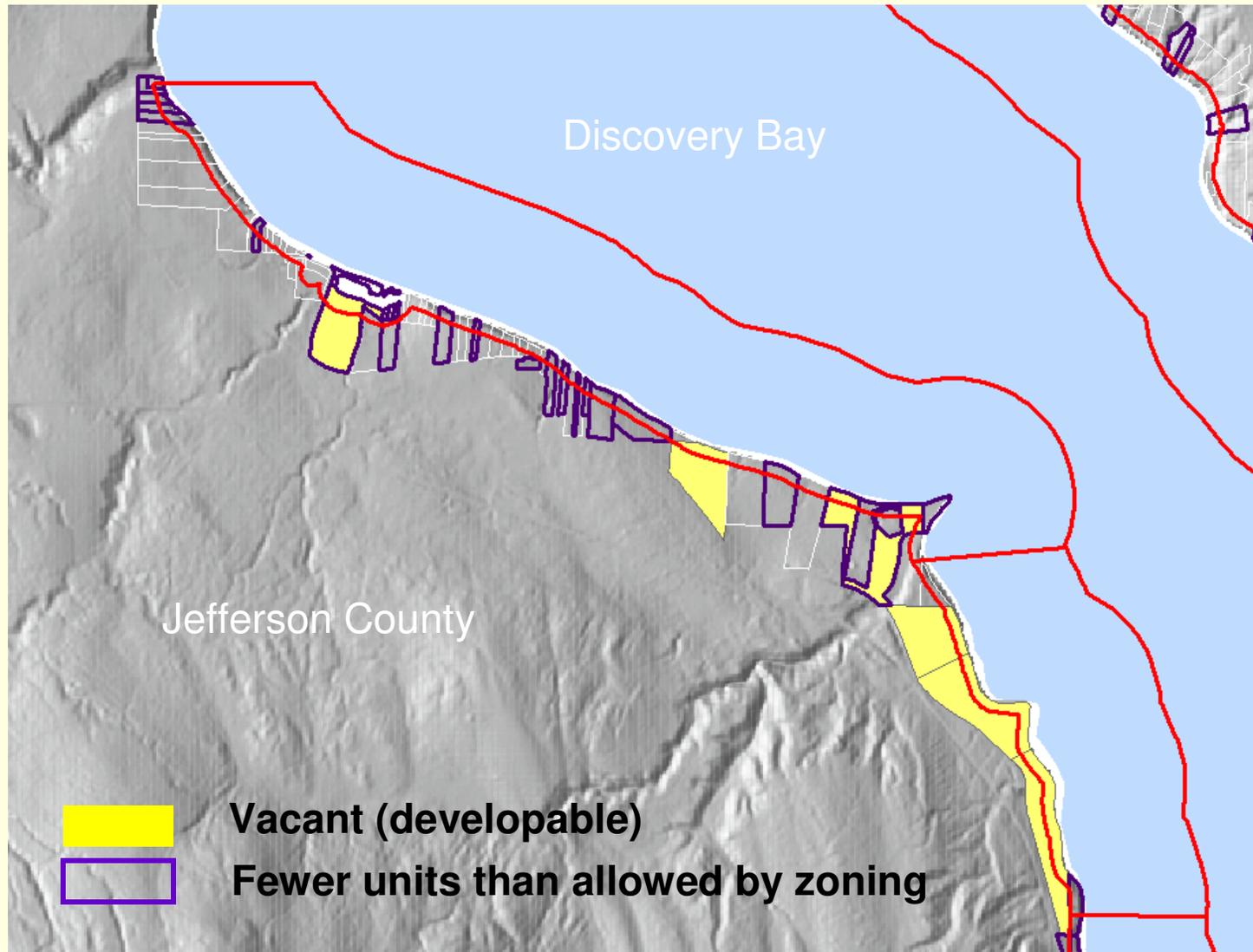
Key considerations:

1. Types of use
2. Units/acre (density)
3. Age of structures
4. Infrastructure availability
5. Lot pattern & dimensions
6. Site constraints (e.g., high/low bank)
7. Consistency with planning goals

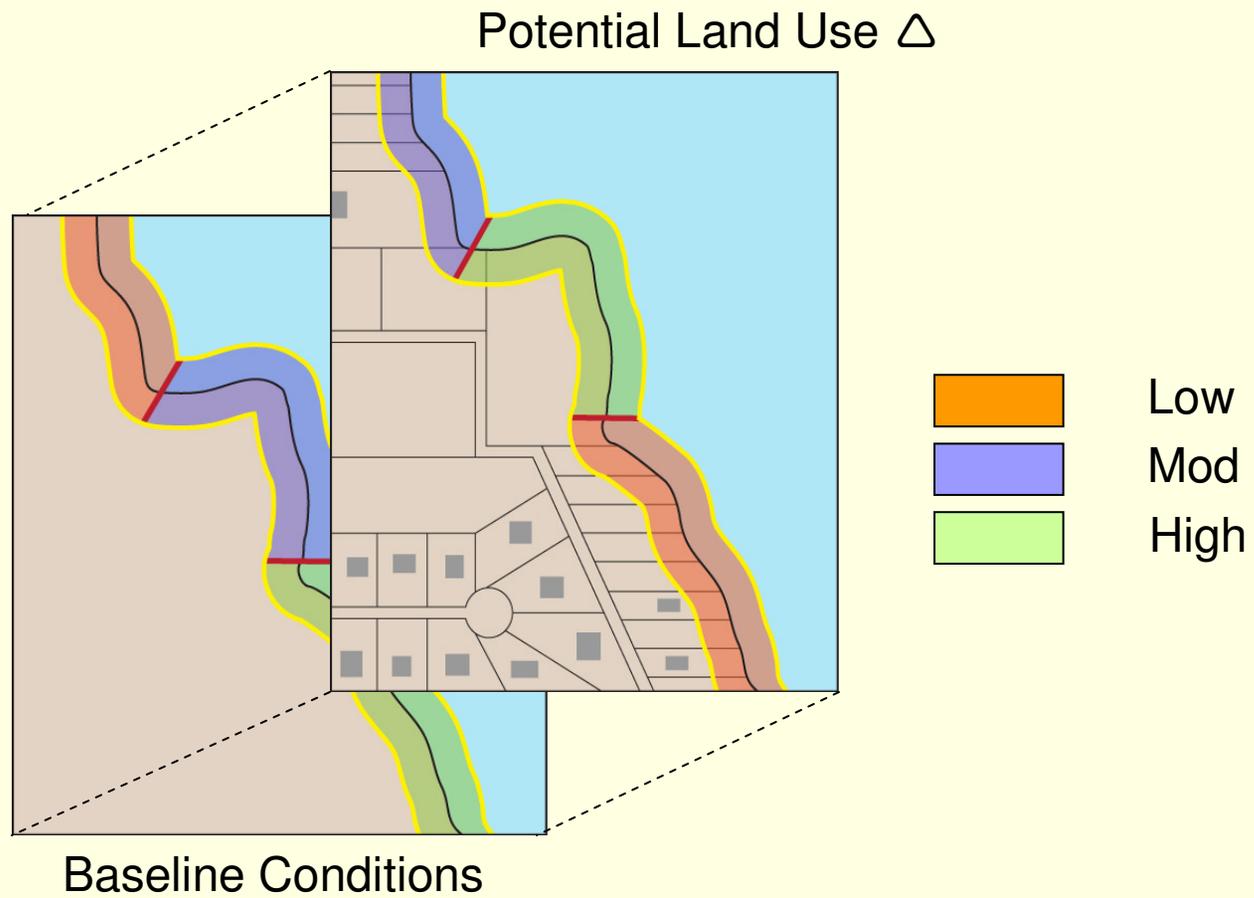
Parcel analysis

- Developed or undeveloped?
- No. of units per acre?
- Existing no. units less than allowed by zoning?
- Significant constraints to future development?
- Infrastructure adequate to support future development?
- New waterfront lots likely?
- Existing structures likely to be expanded or redeveloped?

Potential Land Use Change: Un- / Under-developed Parcels



Results for step 2



Risk of functional loss

1. Will future development occur in high function areas?
 - ❖ No – go to question 2
 - ❖ Yes – go to question 3
2. Will future development occur in unaltered areas?
 - ❖ No – **Risk of loss is low**
 - ❖ Yes – go to question 3
3. Is the type of future development likely to cause impacts (clearing, armoring, septic...)?
 - ❖ No – **Risk of loss is low**
 - ❖ Yes – **Risk of loss is high**

Do you plan for the worse case scenario?

Characterizing risk

High

Baseline conditions are *Good* and potential land use change is *High*

Moderate

Baseline conditions are *Good* or *Fair* and potential land use change is *High* or *Moderate*

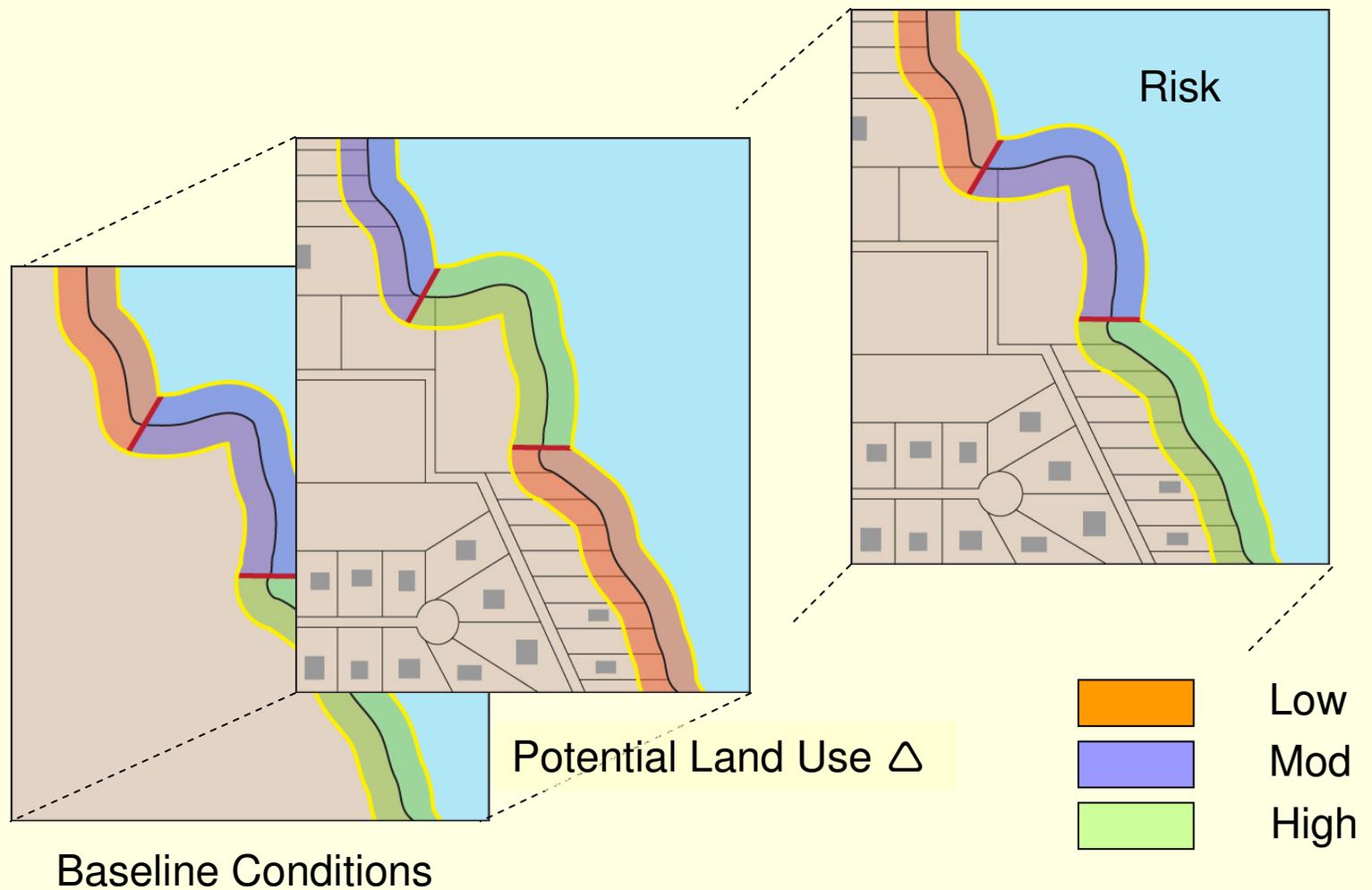
Low

Baseline conditions are *Fair* or *Poor* and potential land use change is *Low*

Or

Baseline condition is *Poor* and potential land use change is *High*

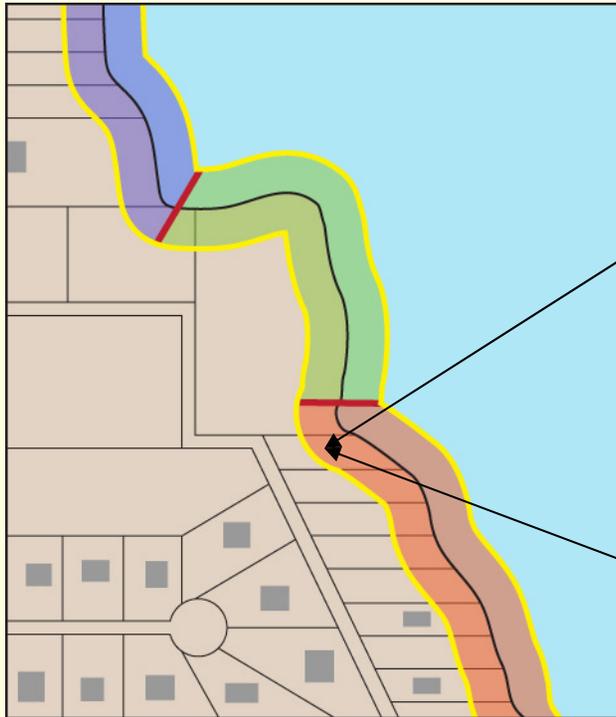
Results for step 3



Tailoring SMP management

- Designations, policies and regulations can address specific risks to specific functions at specific locales
 - e.g., different dock standards for places where new docks are likely *and* where new docks are likely to affect eelgrass compared to other places
- Restoration can be more explicitly tied to expected functional losses

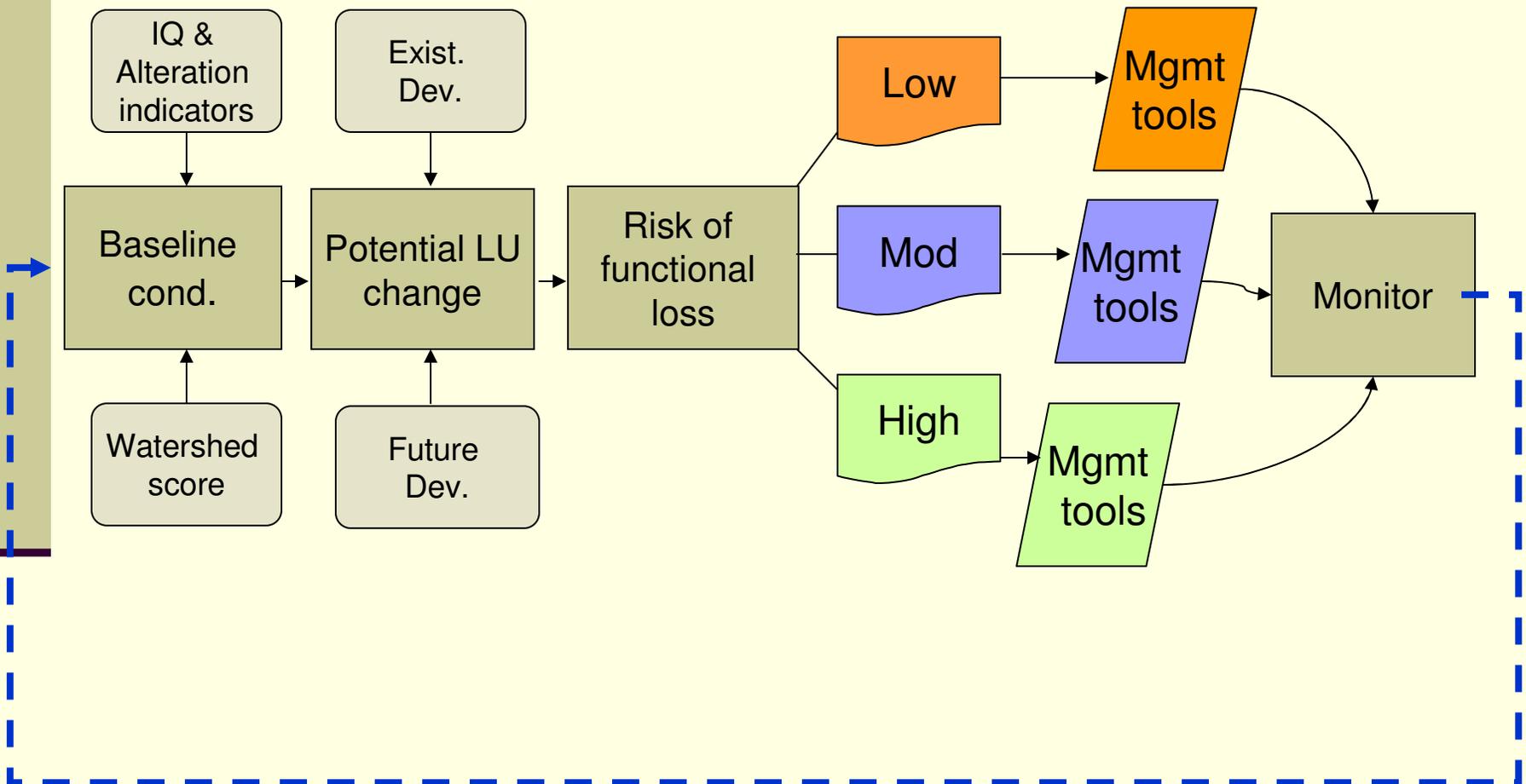
Using the framework - implementation



| Reach | Parcel | IQ Indicator | | | | | | Total score |
|-------|--------|--------------|--------------|---------|-------------|----|----|-------------|
| | | Eelgrass | Feeder bluff | Wetland | Forage fish | ?? | ?? | |
| A | 1 | ✓ | ✓ | | ✓ | | | # |
| | 2 | | | | | | | |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| B | 1 | | | | | | | |
| | 2 | | | | | | | |
| | 3 | | | | | | | |

| Reach | Parcel | Alteration Indicator | | | | | | Total score |
|-------|--------|----------------------|-----------|----------------------|-----------------------|----|----|-------------|
| | | Armoring | Dock/pier | Lack of forest cover | Restricted SF harvest | ?? | ?? | |
| A | 1 | ✓ | ✓ | | ✓ | | | # |
| | 2 | | | | | | | |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| B | 1 | | | | | | | |
| | 2 | | | | | | | |
| | 3 | | | | | | | |

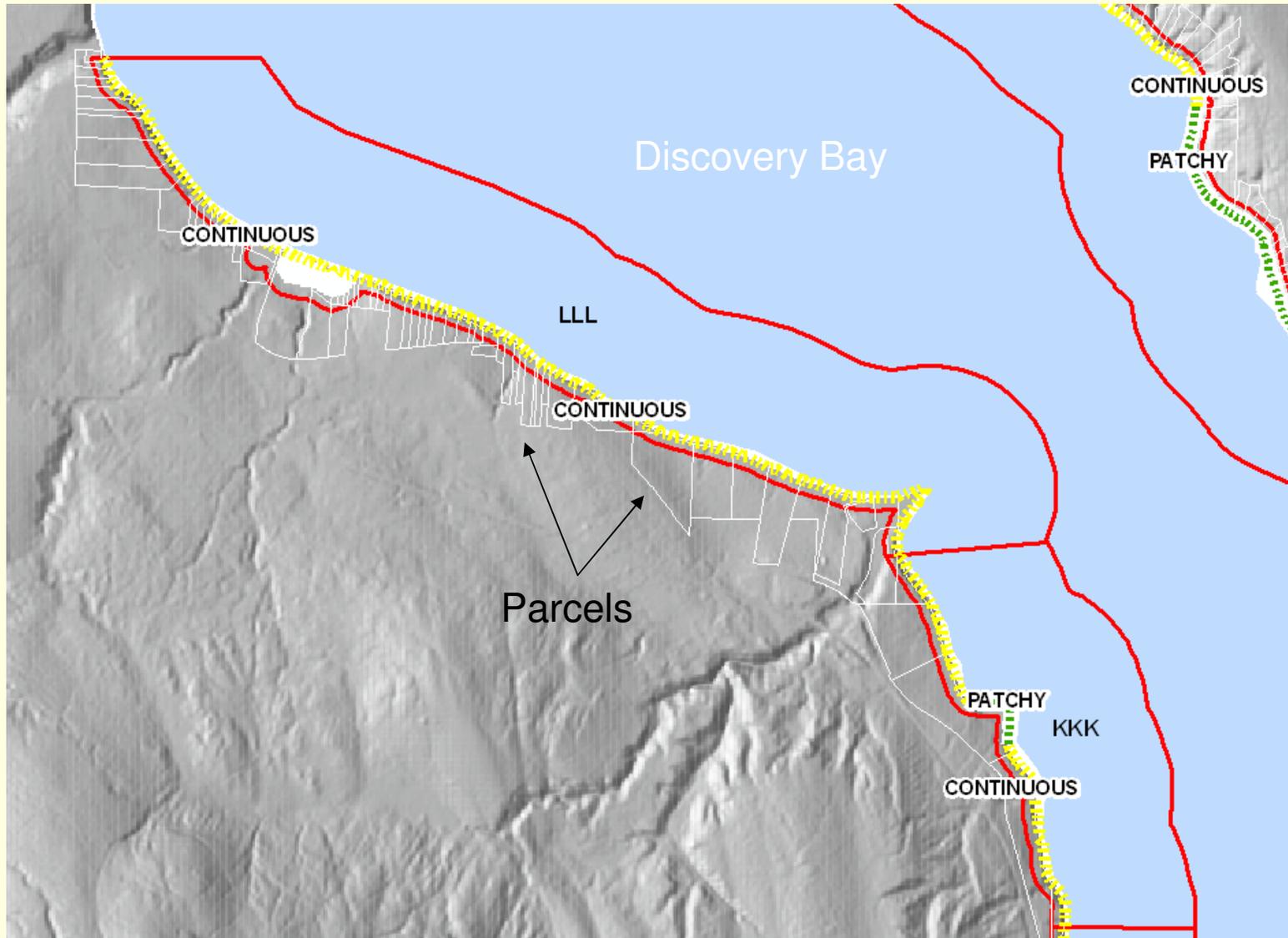
Putting it all together – with monitoring



Benefits

- Creates standardized approach for relating inventory information to SMP decisions (& implementation)
- Based on conceptual models linking SMP decisions to shoreline functions
- Allows for quantitative assessment and monitoring using indicators
 - IQ, alterations and watershed conditions
- Allows you to prioritize and customize management strategies based on a risk assessment approach

IQ Indicator: Eelgrass

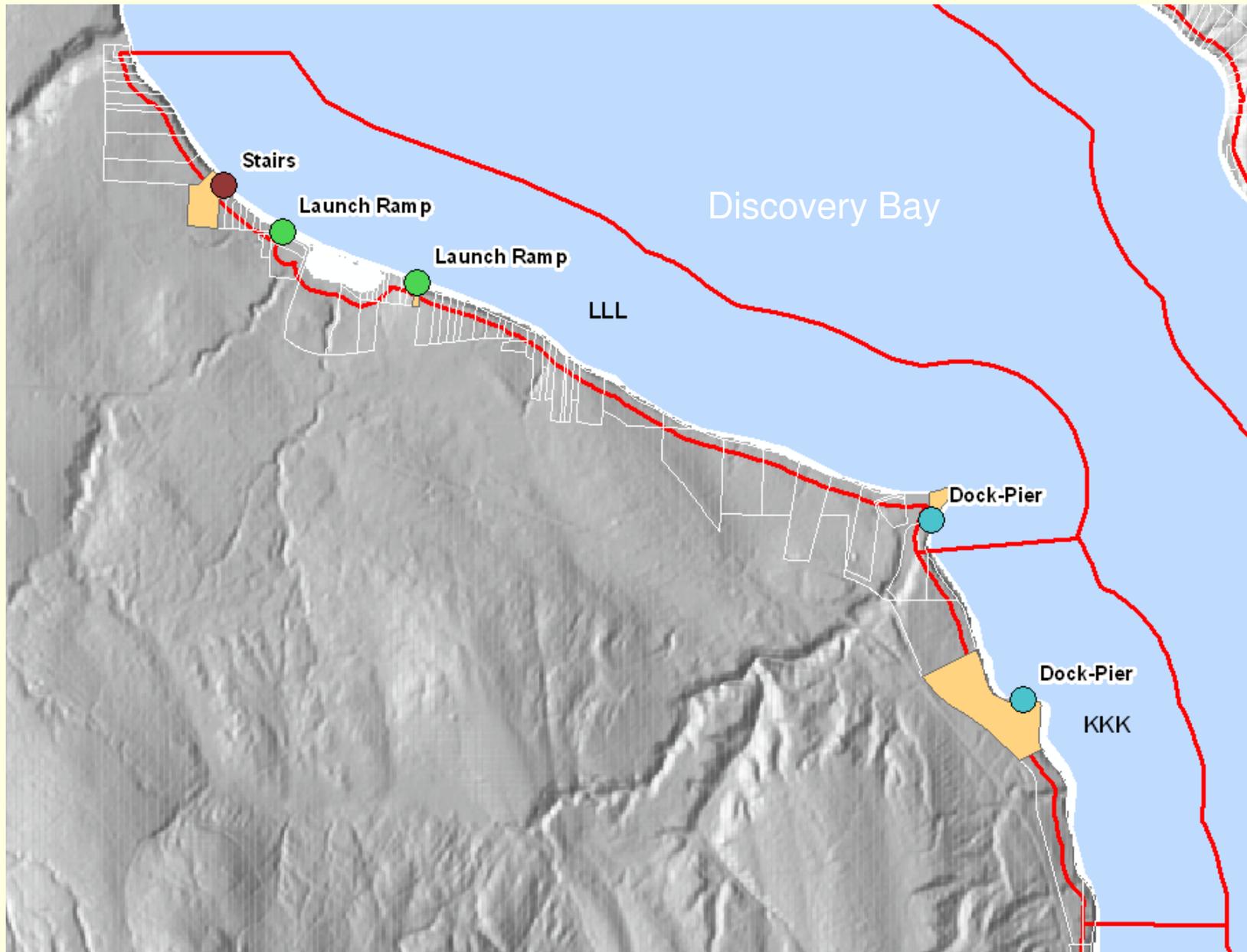


Number of Parcels that have Eelgrass Presence by Reach

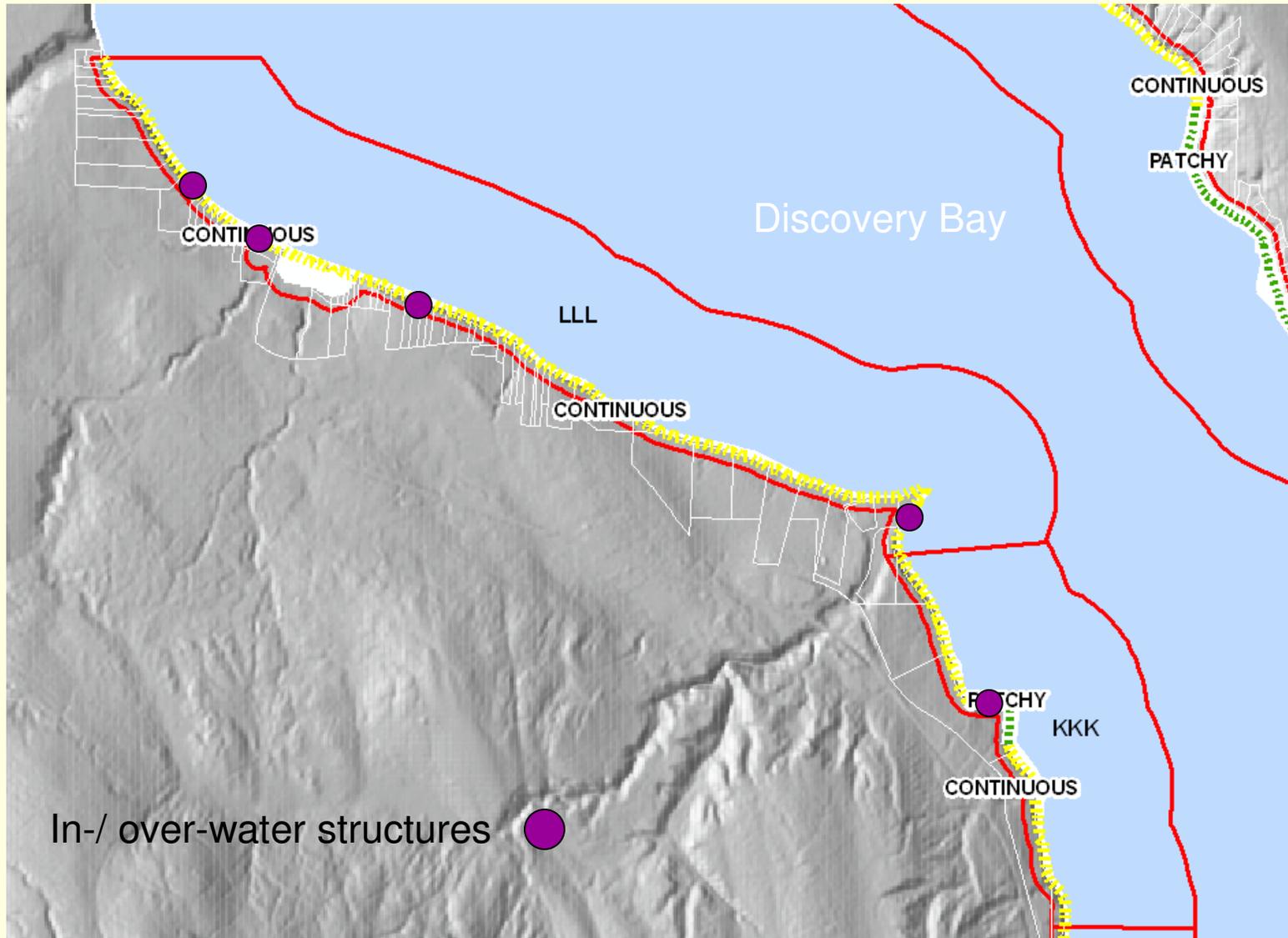
| Reaches | CONTINUOUS | PATCHY | Total Eelgrass | Total % Eelgrass | Total # Parcels |
|------------|------------|--------|----------------|------------------|-----------------|
| GGG | 1 | 4 | 5 | 71.4% | 7 |
| HHH | 17 | 11 | 28 | 13.3% | 210 |
| III | 19 | 25 | 44 | 24.2% | 182 |
| JJJ | 4 | 2 | 6 | 6.7% | 89 |
| KKK | 3 | 1 | 4 | 75.0% | 6 |
| LLL | 27 | | 27 | 34.6% | 78 |
| | | | | | 572 |

Could create % breakouts by continuous/patchy and use this to generate a qualitative score.

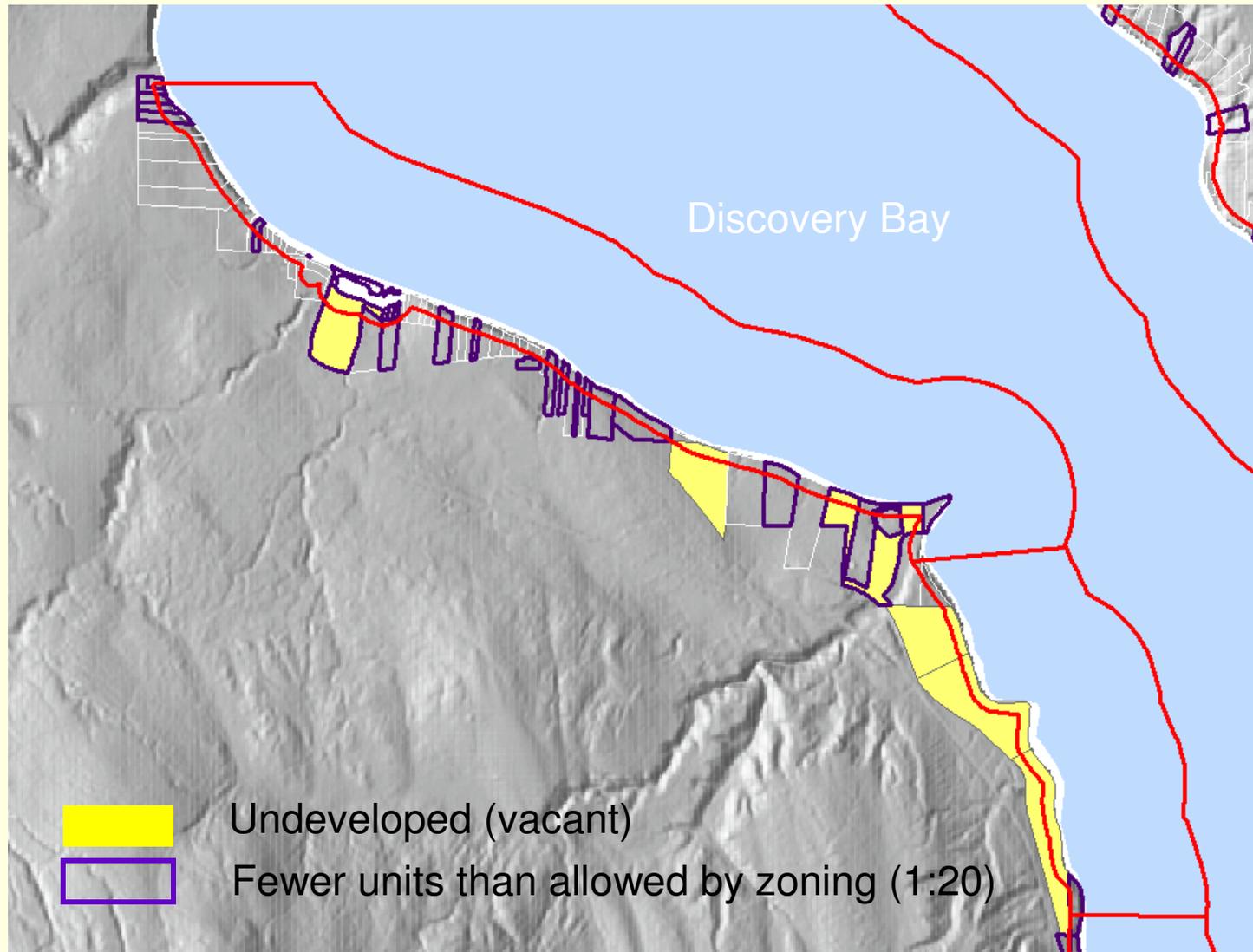
Alteration Indicator: Shoreline modifications



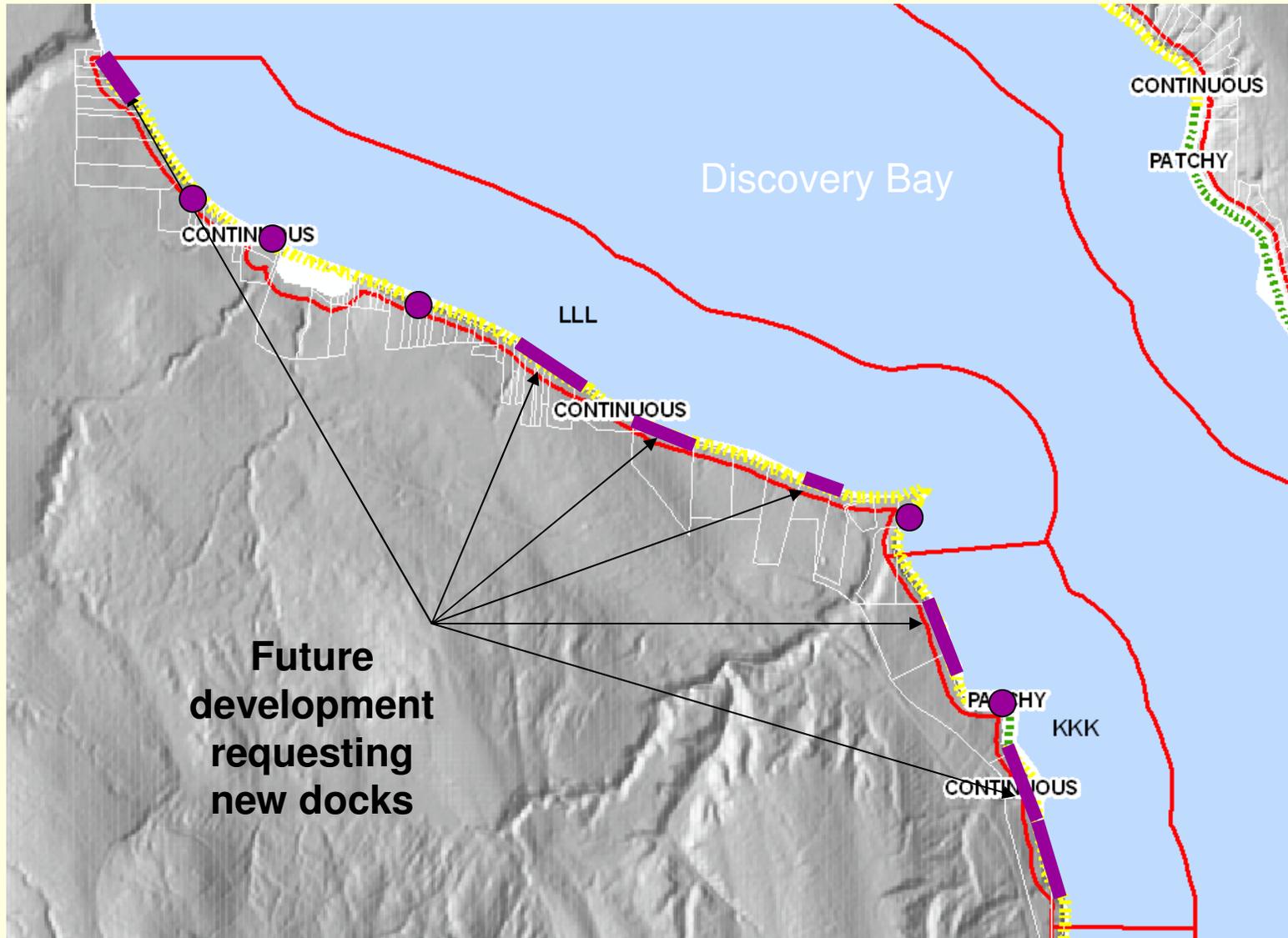
Eelgrass and shoreline modifications



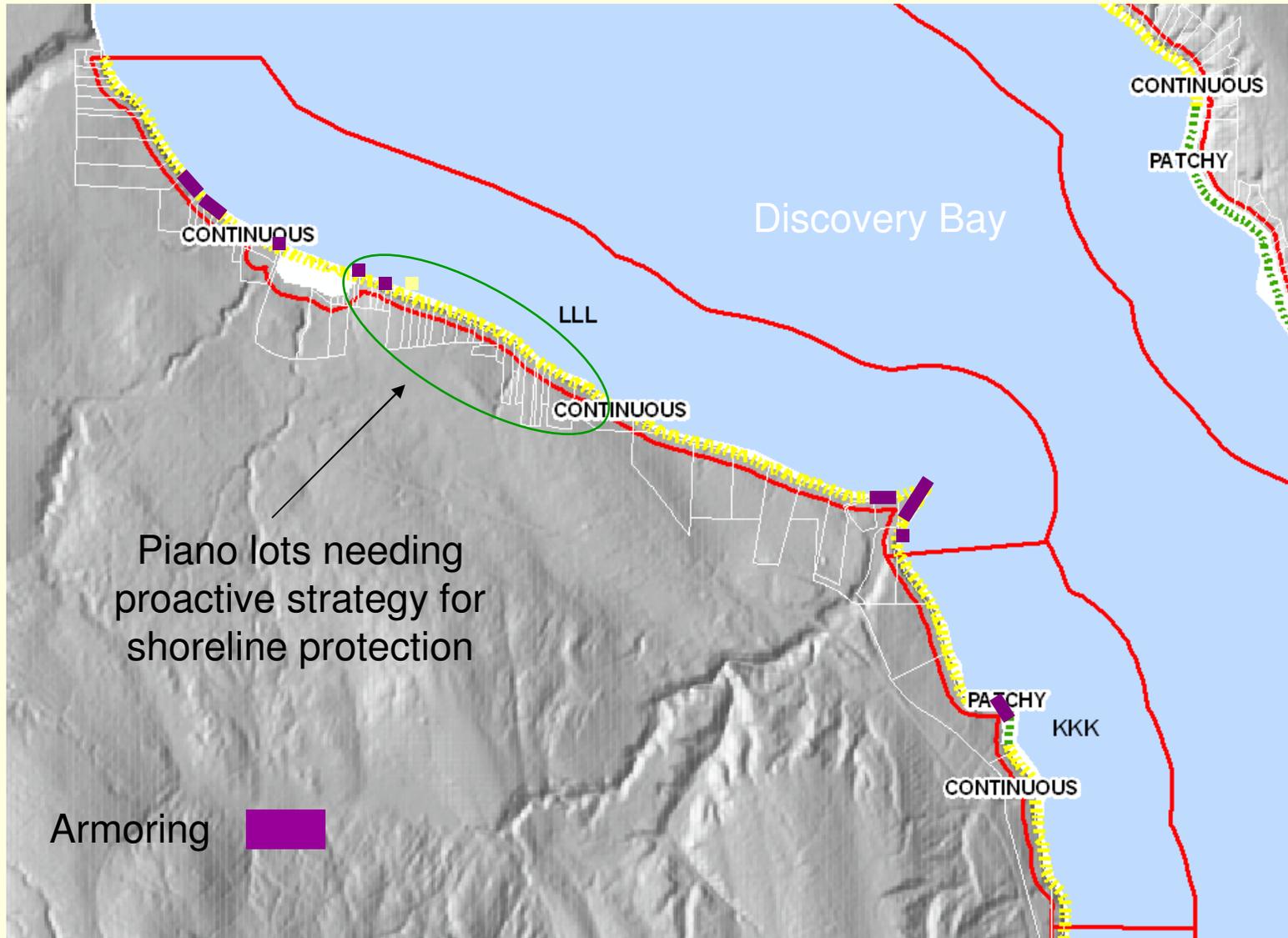
Potential Land Use Change: Un- / Under-developed Parcels



Areas where eelgrass is at risk due to new docks



Eelgrass and future armoring





I'm just a geoduck
What do you think?