# An Alternatives Analysis Tool for West Coast Groundfish EFH Review

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## Goal: Build a useful web mapping application for decision-makers and stakeholders

- Keep it Simple
- Focus on Key Users
- Be Responsive to User Input
- It May Be Ugly Along the Way
- It Will Have Bugs
- Success ≠ Perfection

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# Groundfish EFH Review - Background

- West Coast Groundfish EFH Conservation Areas (EFHCA) = Closures to commercial trawl fishing
- Pacific Fishery Management Council (PFMC) evaluating modifications to current closures
- Consider ecosystem and economics

Photo: NOAA

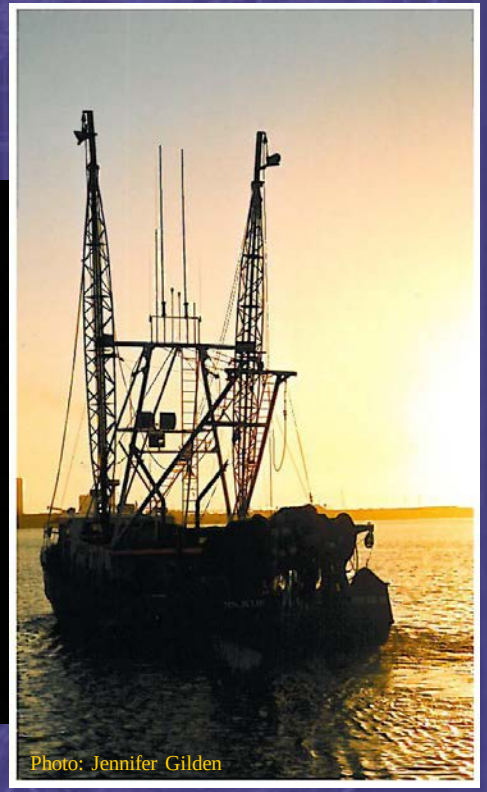
Photo: Jennifer Gilden

http://www.pcouncil.org/groundfish/groundfish-essential-fish-habitat/

# Why a Web Mapping Tool?

- Tabular Data Overload
  - 3 Full Alternatives
  - 6 Additional Proposals
  - 238 Polygons
  - >10 metrics / polygon
  - 11 pages of metrics

| Action | Polygon Name | Spatial extent (mi2) | Hard | | Soft | | Unknown | | Canyon | | Primary Biogenic Habitat | | | | | | | | | | | | OFS 20%HUP | | Conservation Value | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | DSC | | Sponges | | | | | DSC&S | | | | | | | |
| | | | mi² | % | | % | mi² | % | mi² | % | 1km cell count | cells | % | cells | % | cells | | | | % | mi² | % | | | Mean | Var. |
| close | Arago Reef | 67 | 11 | | | | 9.0 | 0 | 0.0 | 0 | 0.0 | 208 | 5 | 2.4 | 5 | 2.4 | 0 | | | | | 4 | 0 | 0.0 | 0.35 | 0.13 |
| close | Ascension Canyonhead | 6 | <1 | | | | | 0 | 0.0 | 4 | 67.8 | 34 | 5 | 14.7 | 5 | 14.7 | 5 | 14.7 | | | | | 0 | 0.0 | 0.56 | 0.08 |
| close | Astoria Deep | 39 | | 0 | 0.0 | | | 0 | 0.0 | 14 | 36.4 | 137 | 1 | 0.7 | 0 | 0.0 | 0 | 0.0 | | | | | 0 | 0.0 | 0.35 | 0.11 |
| close | Big Sur Coast Modification | 45 | | 0 | 0.0 | | | | 0.0 | 0 | 0.0 | 159 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | | | | | 0 | 0.0 | 0.43 | 0.15 |
| close | Biogenic 2 Northern Modification | 44 | | 0 | 0.0 | 44 | | | 0.0 | 23 | 52.4 | 151 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | | | | 0 | 0.0 | 0.39 | 0.09 |
| close | Blurts Reef Modification | 3 | 2 | 0 | 0.0 | 6 | | | | 2 | 17.4 | 48 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | | | | | 0.0 | 0.58 | 0.07 |
| close | Brush Patch | 4 | 0.0 | 0 | 0.0 | 46 | 100.0 | | | | 0.2 | 144 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | | | | | 0.0 | 0.43 | 0.10 |
| close | Cordell Bank Modification 1 | | 6.9 | trace | 1.4 | 3 | 91.7 | | | | 0.0 | 22 | 2 | 9.1 | 0 | 0.0 | 0 | 0.0 | 2 | | | | | 0.0 | 0.58 | 0.14 |
| close | Cordell Bank Modification 2 | | 32.5 | 0 | 0.0 | 3 | 67.5 | 0 | | | 0.0 | 33 | 7 | 21.2 | 0 | 0.0 | 5 | 15.2 | 7 | | | | | 0.0 | 0.55 | 0.08 |
| close | Eel River Canyon Modification 2 | | 0.0 | 0 | 0.0 | 2 | 100.0 | 0 | | | | 20 | 2 | 10.0 | 0 | 0.0 | 2 | 10.0 | 2 | | | | | 86.6 | 0.56 | 0.07 |
| close | Eel River Canyon Modification 4 | | 0.0 | 0 | 0.0 | 11 | 100.0 | 0 | 0.0 | | | 47 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | | | | | 0.0 | 0.46 | 0.12 |
| close | Farallon Escarpment | | 0.0 | 0 | 0.0 | 126 | 100.0 | 0 | 0.0 | | | 250 | 2 | 0.5 | 2 | 0.5 | 0 | 0.0 | 2 | | | | | 0.0 | 0.47 | 0.10 |
| close | Farallon Islands Modification | | 55.5 | 0 | 0.0 | 7 | 44.5 | 0 | 0.0 | | | 3 | 3 | 9.7 | 5 | 16.1 | 2 | 6.5 | 5 | | | | | 0.0 | 0.57 | 0.12 |
| close | Gobbler's Knob | | 0.0 | 2 | 92.5 | <1 | 7.5 | 0 | 0.0 | 0 | | 0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | | | | | 0.0 | 0.56 | 0.14 |
| close | Grays Canyon Southern Modification | | 4.0 | 0 | 0.0 | 12 | 96.0 | 0 | 0.0 | 0 | | | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | | | | | 56.8 | 0.59 | 0.09 |
| close | Mad River Rough Patch | | 20.5 | 0 | 0.0 | 4 | 79.5 | 0 | 0.0 | 1 | 26.6 | | 2 | 7.2 | 0 | 0.0 | 3 | 11.5 | 2 | | | | | 7.1 | 0.47 | 0.11 |
| close | MBNMS Ascension and Ano Nuevo Canyon Complex | | 27.7 | 0 | 0.0 | 14 | 72.3 | 0 | 0.0 | 14 | 72.4 | 7 | | | 0 | 0.0 | 6 | 8.6 | 6 | | | | | 0.0 | 0.55 | 0.11 |
| close | MBNMS Between Partington Point and Lopez Point | 74 | 0 | 0 | 0.0 | 74 | 100.0 | 0 | 0.0 | 20 | 27.4 | 222 | 2 | | | 0.0 | 4 | 1.8 | 2 | | | | | 0.0 | 0.46 | 0.10 |
| close | MBNMS La Cruz Canyon | 9 | | 0 | 0.0 | 2 | 17.2 | 0 | 0.0 | 0 | 0.0 | 44 | 0 | | | | 0 | 0.0 | 0 | | | | 0 | 0.0 | 0.55 | 0.10 |
| close | MBNMS Outer Soquel Canyon | 8 | | 0 | 0.0 | 4 | 64.1 | 0 | 0.0 | 1 | 20.6 | 27 | 16 | 59.3 | | | 17 | 63.0 | | | | | 0 | 0.0 | 0.54 | 0.08 |
| close | MBNMS Point Sur Platform | 11 | | 0 | 0.0 | 3 | 25.6 | 0 | 0.0 | 0 | 0.0 | 44 | 9 | 20.5 | | | 2 | 4.5 | | | | | 0 | 0.0 | 0.41 | 0.08 |
| close | MBNMS South of Davenport | 6 | | | 0.0 | 3 | 47.1 | 0 | 0.0 | 0 | 0.0 | 34 | 16 | 47.1 | 3 | | | 41.2 | | | | | 0 | 0.0 | 0.58 | 0.11 |
| close | MBNMS Southwest of Smooth Ridge | 6 | 0 | | 0.0 | 6 | 100.0 | 0 | 0.0 | 0 | 0.0 | 33 | 1 | 3.0 | 0 | | | | | | | 0.0 | 0 | 0.0 | 0.28 | 0.10 |
| close | MBNMS Triangle South of Surveyors Knoll | 9 | <1 | 9 | | 9 | 91.0 | 0 | 0.0 | 0 | 0.0 | 40 | 0 | 0.0 | 0 | 0.0 | | | | | | 0.0 | 0 | 0.0 | 0.47 | 0.14 |
| close | MBNMS West of Piedras Blancas SMCA | 3 | trace | 2.0 | | | 98.0 | 0 | 0.0 | 0 | 0.0 | 19 | 0 | 0.0 | 0 | | | | | | 0 | 0.0 | 0 | 0.0 | 0.59 | 0.10 |

- Users are Place-Based
- Can Evaluate an Ad-hoc Combination of Polygons
- Visual and Interactive

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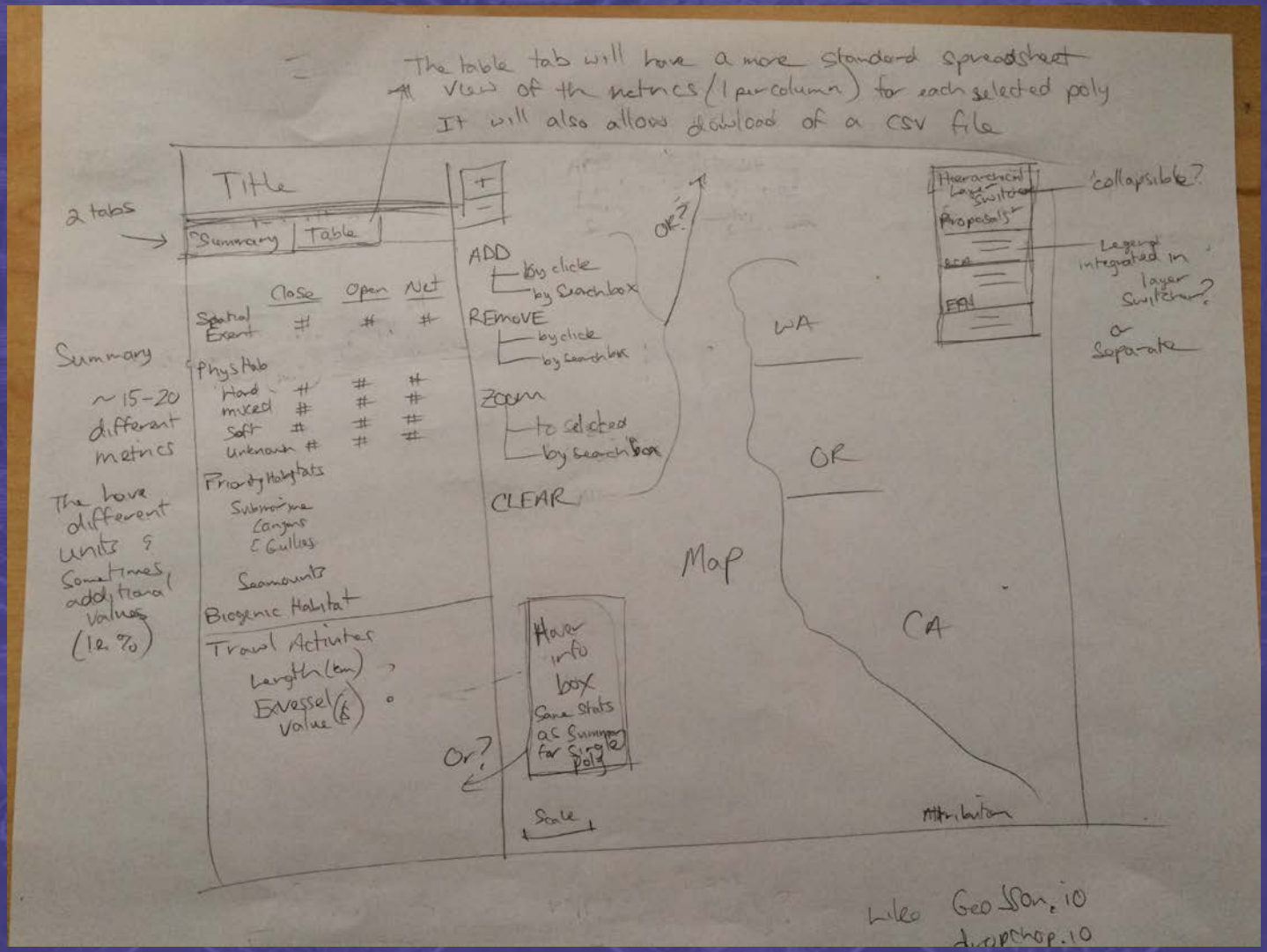
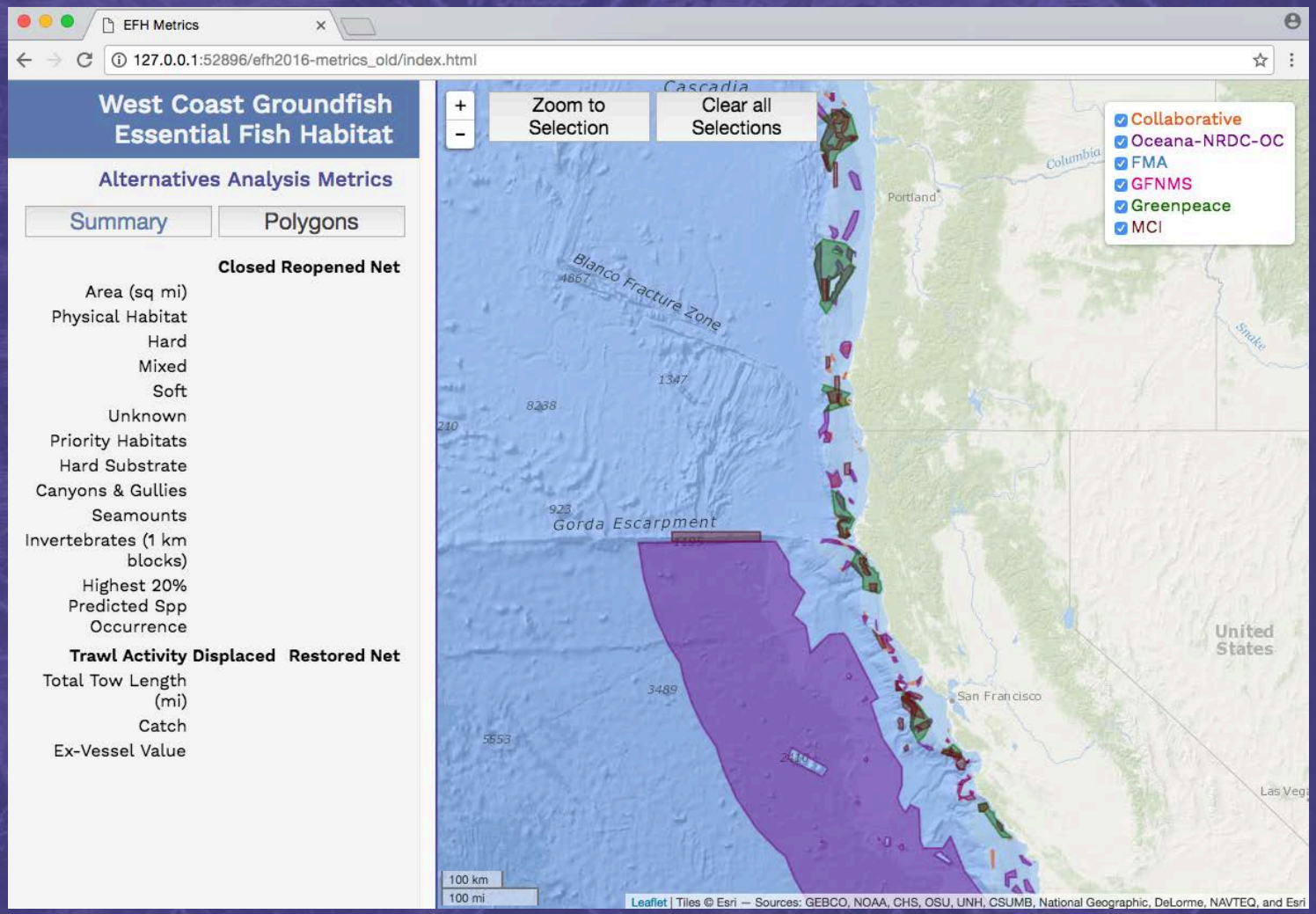
# Diagram the App



# First Pass

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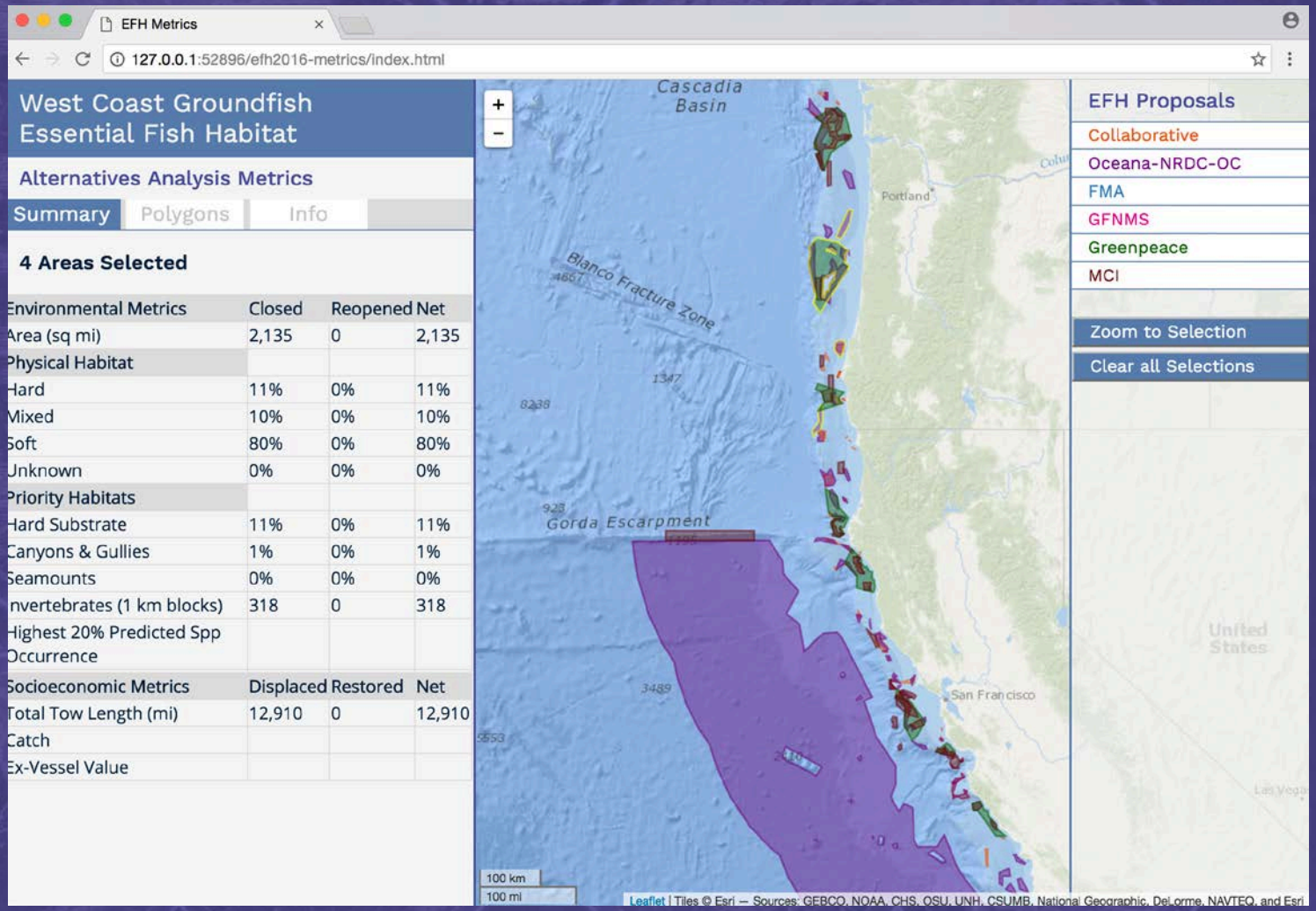
# Getting Better




| Environmental Metrics | Closed | Reopened | Net |
|---|---|---|---|
| Area (sq mi) | 2,135 | 0 | 2,135 |
| Physical Habitat | | | |
| Hard | 11% | 0% | 11% |
| Mixed | 10% | 0% | 10% |
| Soft | 80% | 0% | 80% |
| Unknown | 0% | 0% | 0% |
| Priority Habitats | | | |
| Hard Substrate | 11% | 0% | 11% |
| Canyons & Gullies | 1% | 0% | 1% |
| Seamounts | 0% | 0% | 0% |
| Invertebrates (1 km blocks) | 318 | 0 | 318 |
| Highest 20% Predicted Spp Occurrence | | | |
| **Socioeconomic Metrics** | **Displaced** | **Restored** | **Net** |
| Total Tow Length (mi) | 12,910 | 0 | 12,910 |
| Catch | | | |
| Ex-Vessel Value | | | |

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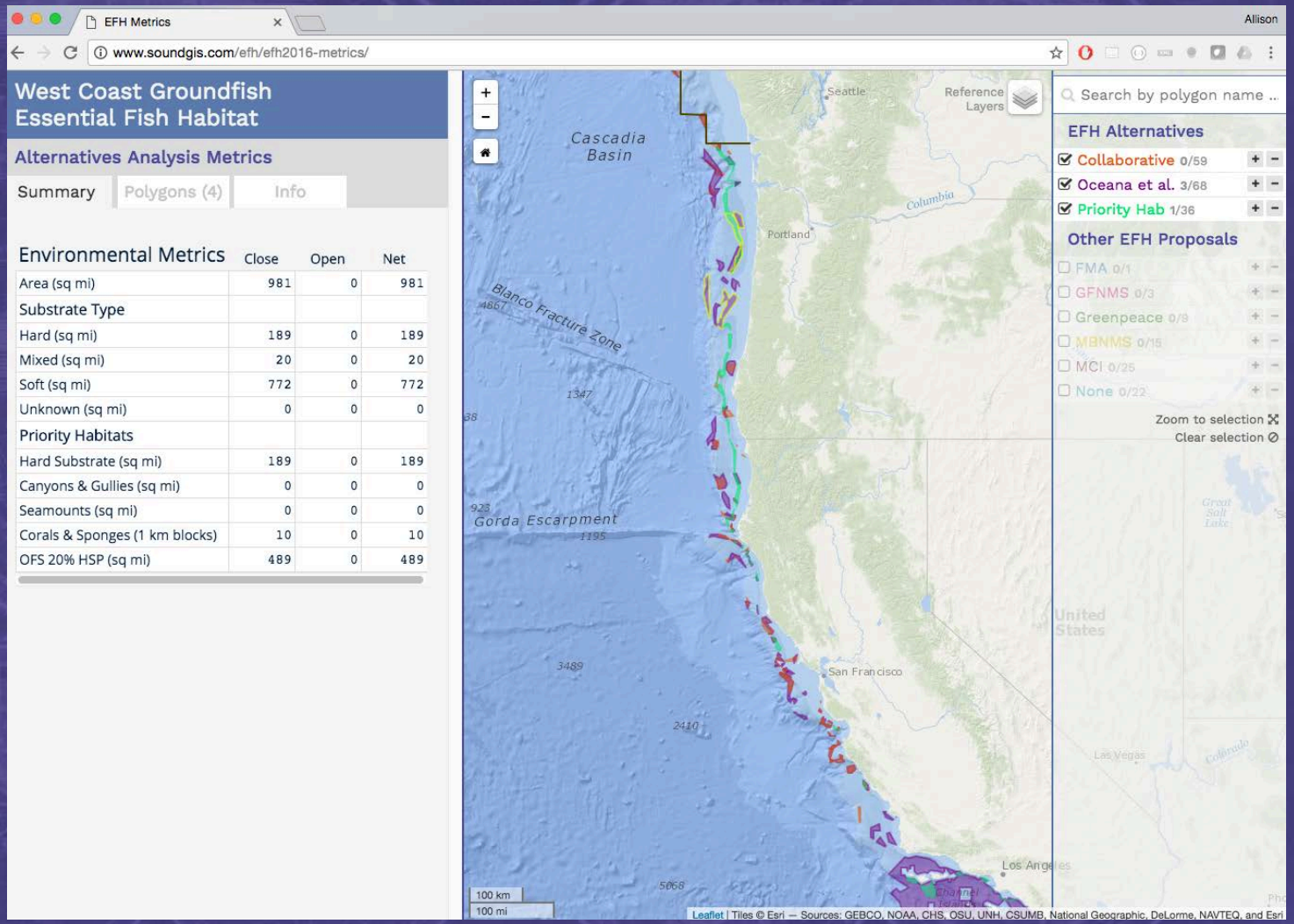
# Final Version

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# Tech

**Editor**

- Brackets, w/Live Preview to serve pages

**Repository and Version Control**

- Git, Github, and GitHub desktop

**Code**

- JavaScript, including libraries: Leaflet, JQuery, Turf, ESRI-Leaflet, Easy-Button, Typeahead, TabletoCSV
- HTML
- CSS

**Fonts and Icons**

- Font Awesome
- Google Fonts

**Data Conversion**

- ESRI2Open

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# In Action! - Pacific Fishery Management Council

http://www.pcouncil.org/2016/11/44904/new-tool-available-to-see-proposed-essential-fish-habitat-trawl-rockfish-conservation-area-modifications/

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# Personal Challenges

- High aspirations – dropchop.io, geojson.io
- Challenge of shifting to asynchronous coding
- Accustomed to being competent
- Fractured but voluminous technical resources

But, Remember….

- It May Be Ugly Along the Way
- It Will Have Bugs
- Success ≠ Perfection
- Success = It was Useful!

# The Team / Acknowledgments

- Author/Architect/Developer:
  - Allison Bailey, Sound GIS, allison@soundgis.com

- West Coast EFH/RCA Team (NOAA, PFMC): Scientists, Policy Specialists, Economists, Funders
- Technical Assistance and Support from Colleagues

http://www.soundgis.com/efh/efh2016-metrics/

https://github.com/cybersea/efh2016-metrics

# Thank You!

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