# RESTORING SELF-SUSTAINING OFF-CHANNEL HABITAT IN THE SMITH RIVER ESTUARY

SMITH RIVER ALLIANCE

Stillwater Sciences

Coastal Conservancy

PMEP

CALIFORNIA DEPARTMENT OF FISH & WILDLIFE

CALIFORNIA STATE PARKS SINCE 1864

NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION U.S. DEPARTMENT OF COMMERCE

**Where** – Introduce the Smith River Watershed

**Why** – Habitat impairments, restoration goals, and site selection.

**How** - Process-based restoration techniques used to achieve goals.

# SMITH RIVER WATERSHED


SMITH RIVER ALLIANCE
SMITH
RIVER
NATIONAL
RECREATION
AREA
SISKIYOU WILDERNESS
Public Lands
Wild Lands
Other Features

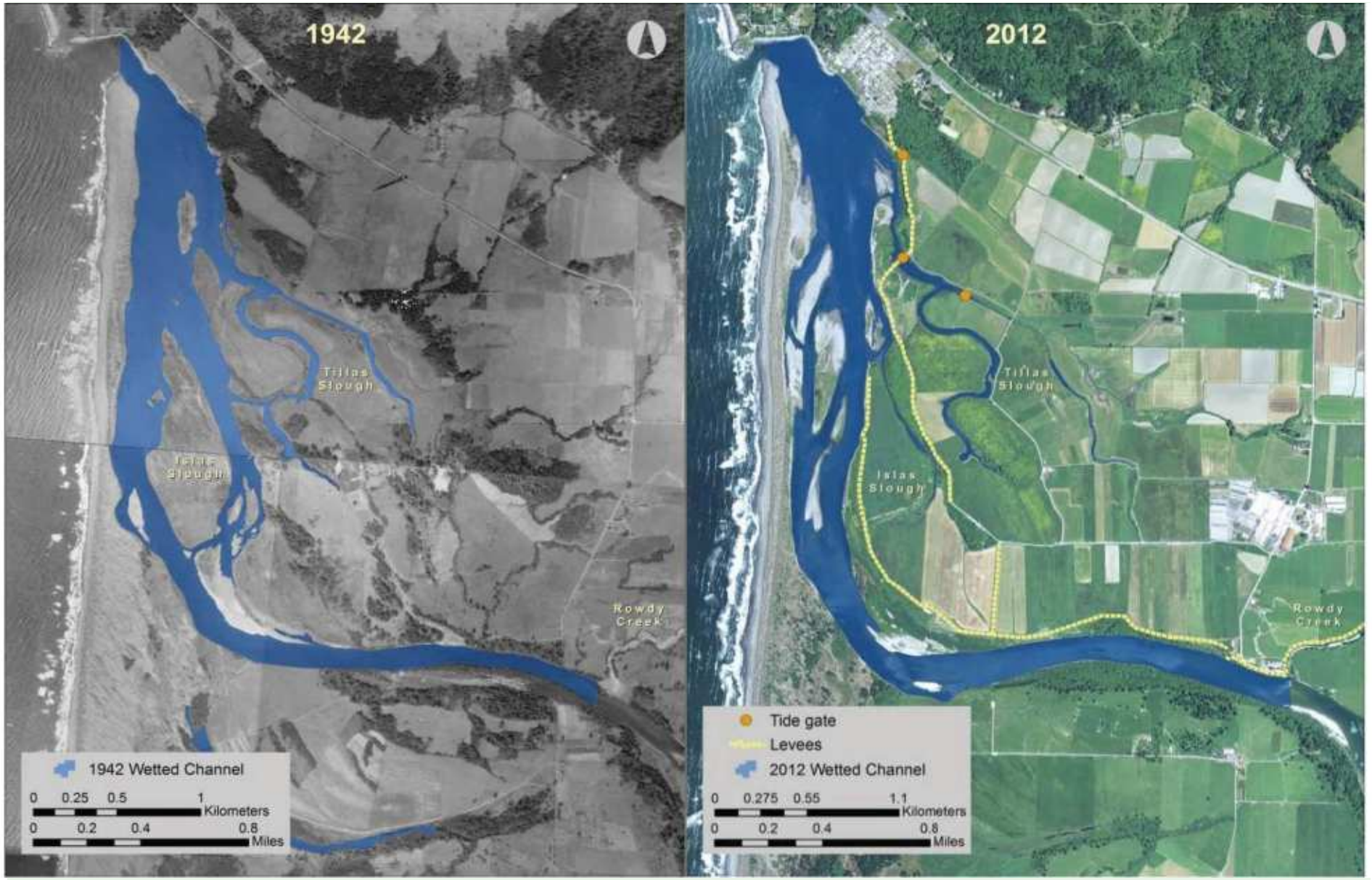



Image from: Distribution of Juvenile Salmonids and Seasonally Available Aquatic Habitats Within the Lower Smith River Basin and Estuary, Del Norte County, California Final Report to CDFW (Parish and Garwood 2015)

## ESTUARY SIMPLIFICATION

**The estuary has been modified and simplified resulting in a loss of floodplain connectivity, slow water, riparian habitat and complexity.**

**Estuary complexity is needed to support diverse life histories and population recovery of salmonids and other aquatic species.**

# COASTAL PLAIN PLANNING

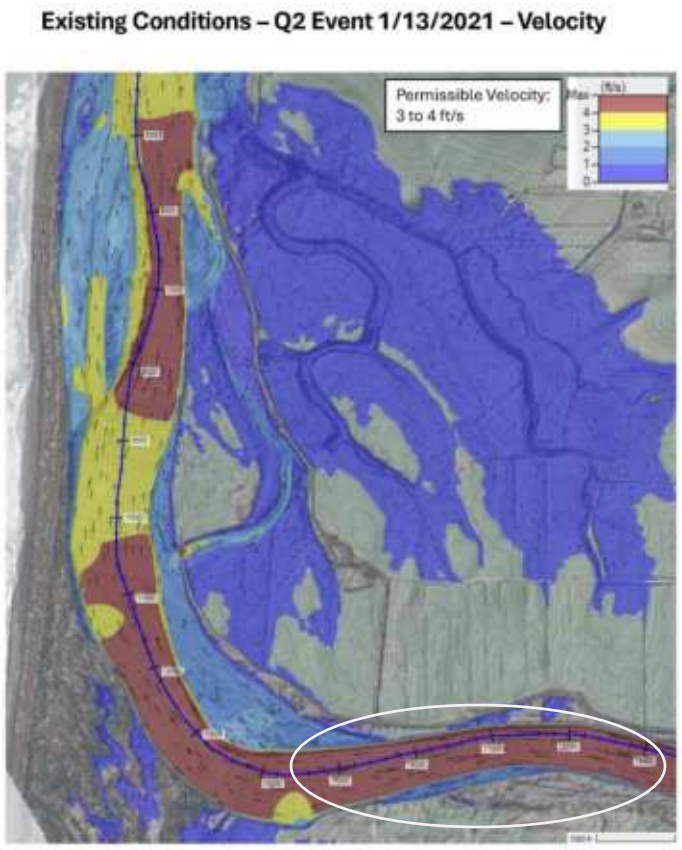


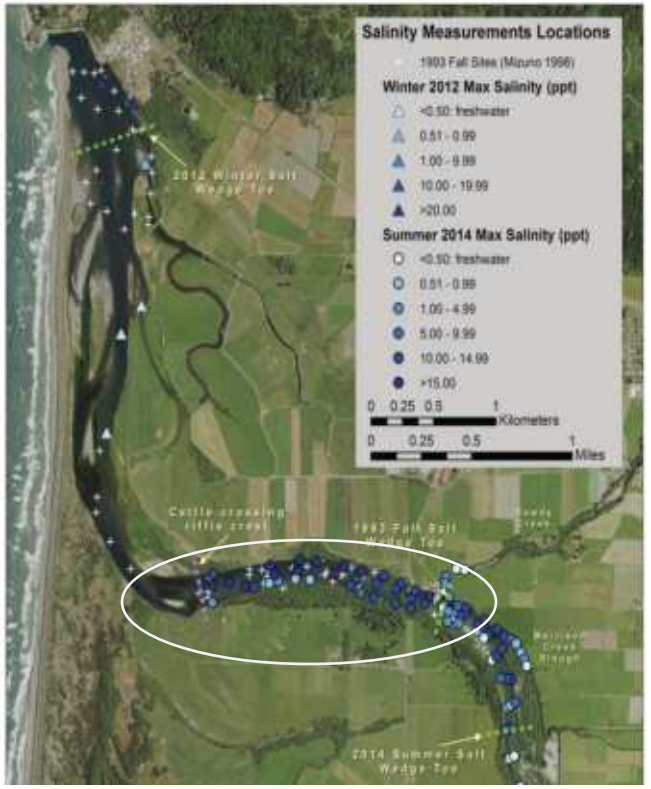
2016 – 2018 Collaborative Process to Identify and Prioritize Projects

- 37.46 miles assessment area
  - 137 projects identified
  - Results Summarized in 2018 Report[1]
    - Backwater Project identified as High Priority to address estuary simplification and habitat loss.

[1]Parish Hanson, 2018, Smith River Plain Stream Restoration Plan, Final Report to the California Coastal Conservancy, Contract: No. 16-027, Smith River Alliance, Crescent City, CA.

# PROJECT SITE IDENTIFICATION





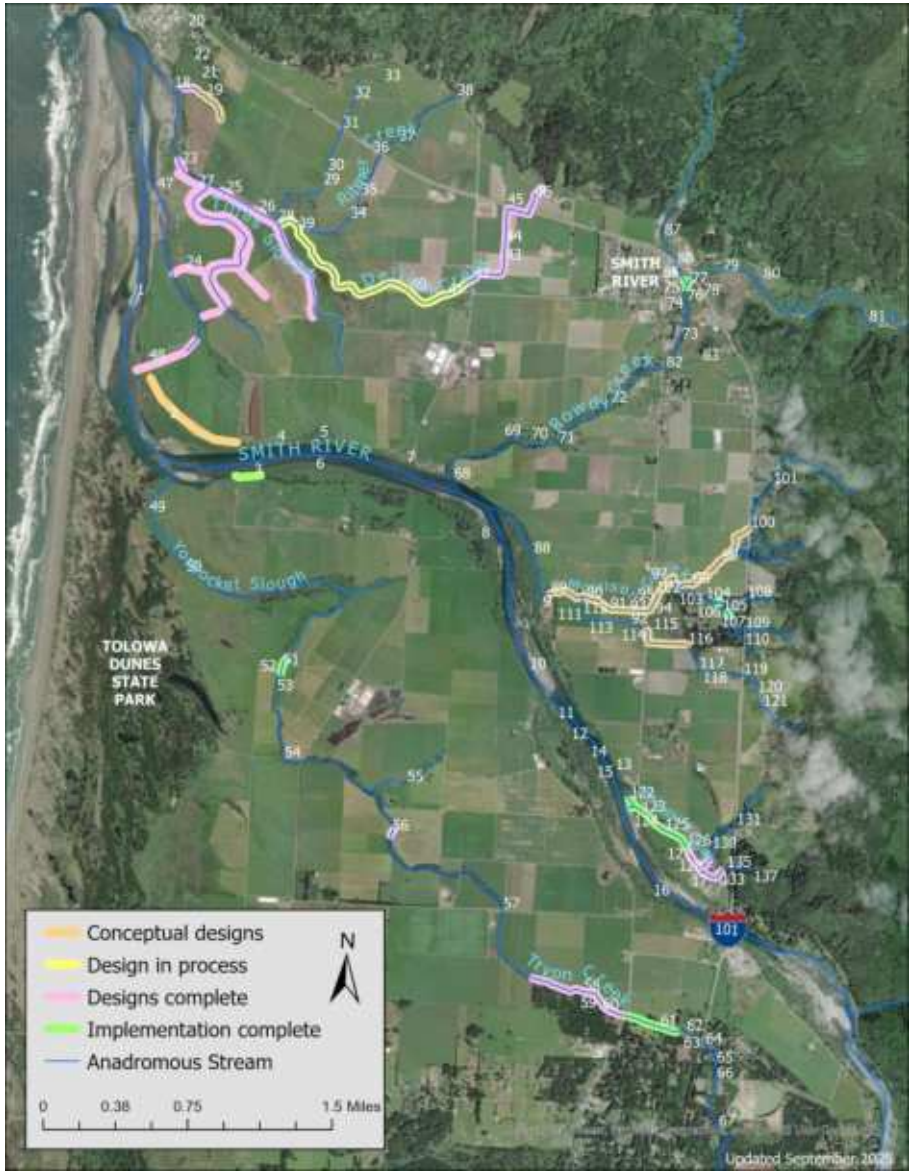
Hydraulic modeling (Michael Love and Associates 2025), salinity map and coho salmon summer and winter observations map (Parish and Garwood 2016).

# LANDSCAPE SCALE RESTORATION

Our case study is one part of a larger restoration strategy. To date we have advanced:

- 51 projects – initial planning and design
- 32 projects - 100% designs completed
- 13 projects advanced to implementation

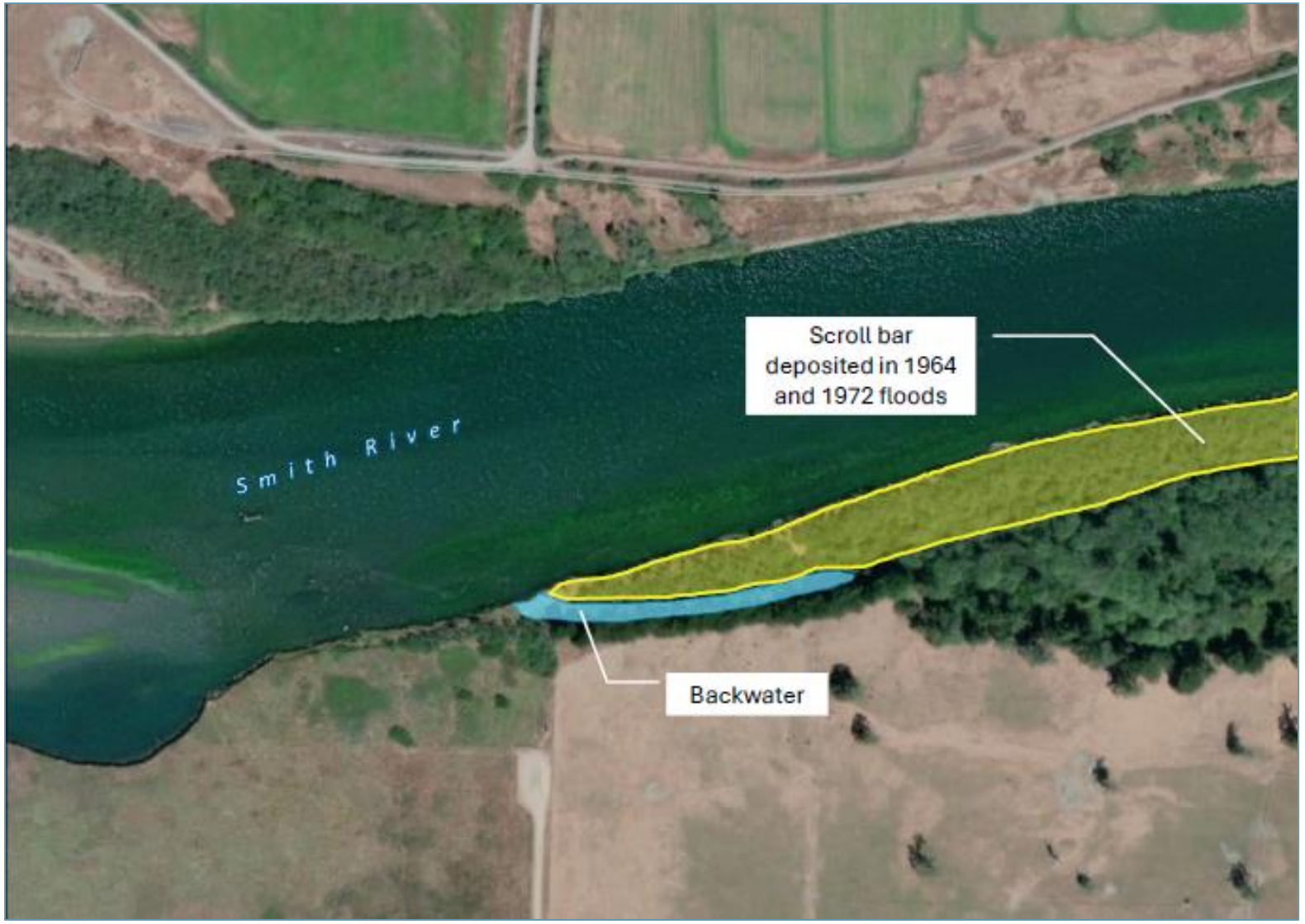
Process based strategies to achieve restoration Goals



# PROCESS BASED RESTORATION TECHNIQUES

- Wood loading
- Tidal influence & sediment transport
- Bioengineering – riparian growth and sediment distribution

# GEOMORPHIC SETTING

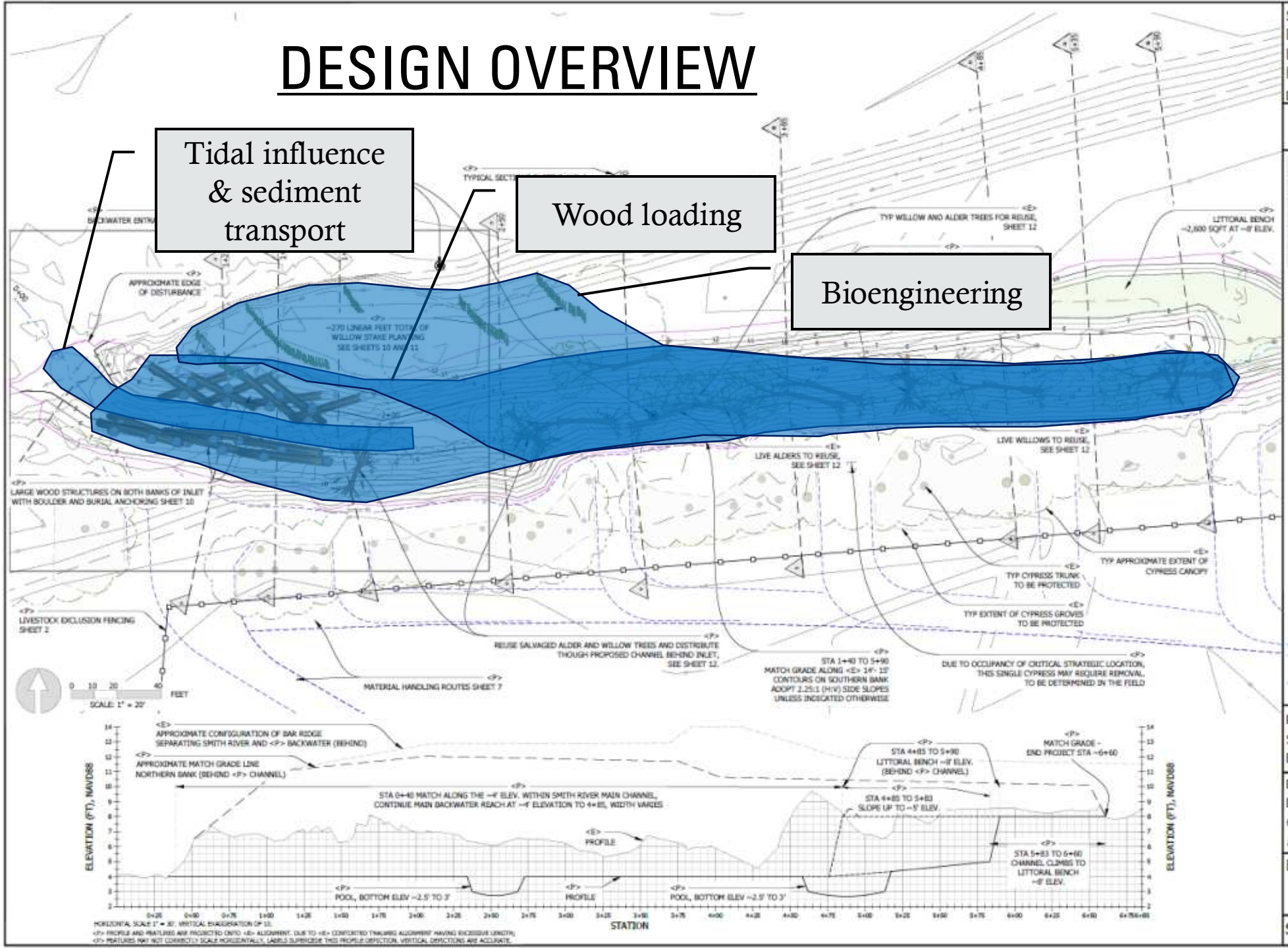


# IMPAIRMENTS

## LIMITED RIVER CONNECTIVITY

## ANTHROPOGENIC AND LAND-USE IMPACTS

# DESIGN OVERVIEW




SMITH RIVER ESTUARY BACKWATER HABITAT ENHANCEMENT - FINAL DESIGN

DEL NORTE COUNTY, CA

Stillwater Sciences

SMITH RIVER ALLIANCE

PROJECT NUMBER: 831.00
SCALE: AS NOTED
DATE: 4/3/21

DESIGN: DC/BW
DRAWN: BW
CHECKED: DC/JM
APPROVED: JM

BACKWATER OVERVIEW

SHEET 3 OF 14


# WOOD LOADING

- Engineered
- Cover structures
- Provide hydro-geomorphic function

# WOOD LOADING

- Non-Engineered
- Cover and riparian function

# TIDAL INFLUENCE

- Increase tidal input
- Create self-sustaining inlet/outlet channel
  - Stable channel geometry (Williams et al. 2002, PWA & Faber 2004)
  - Sediment transport capacity

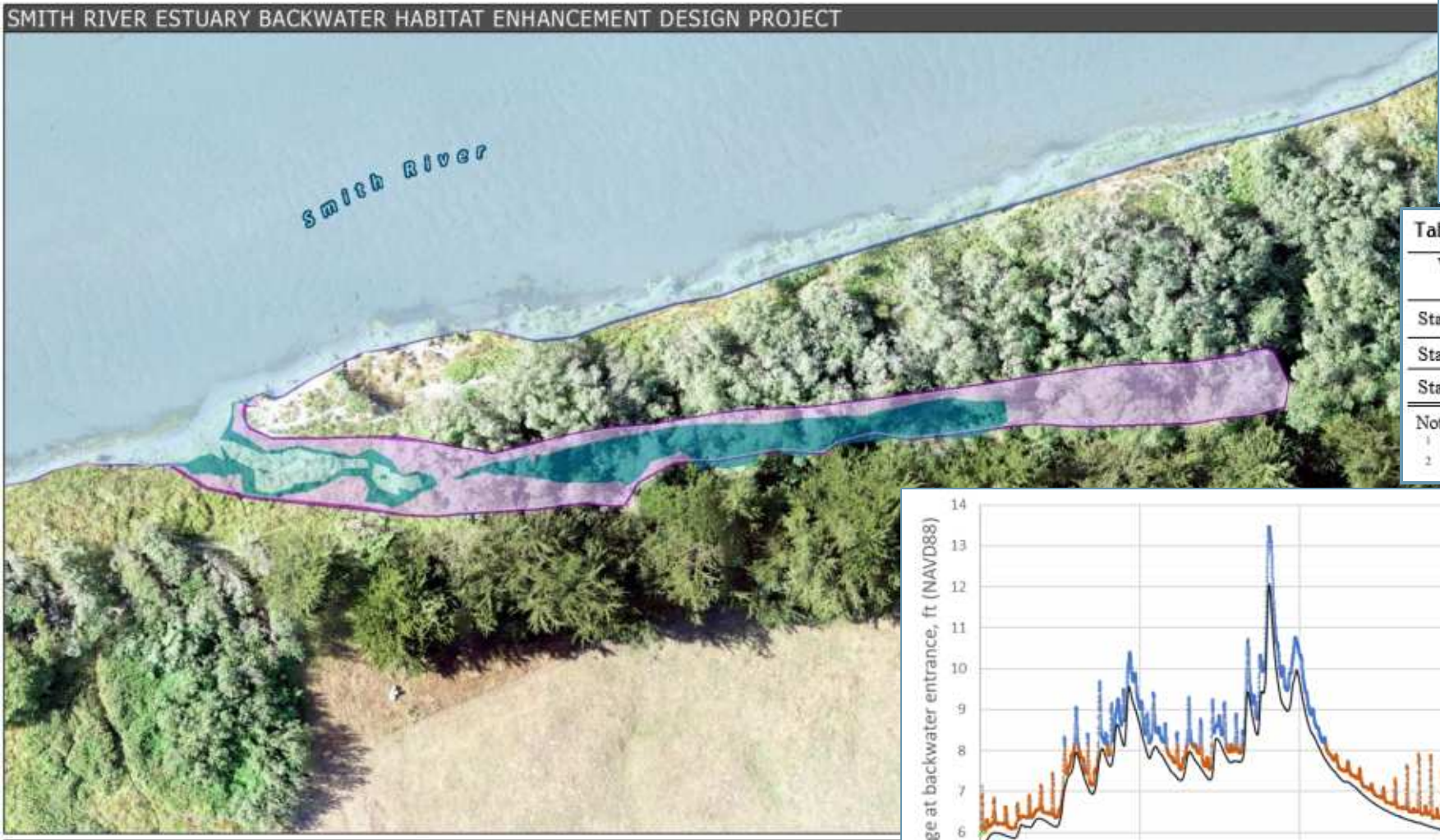
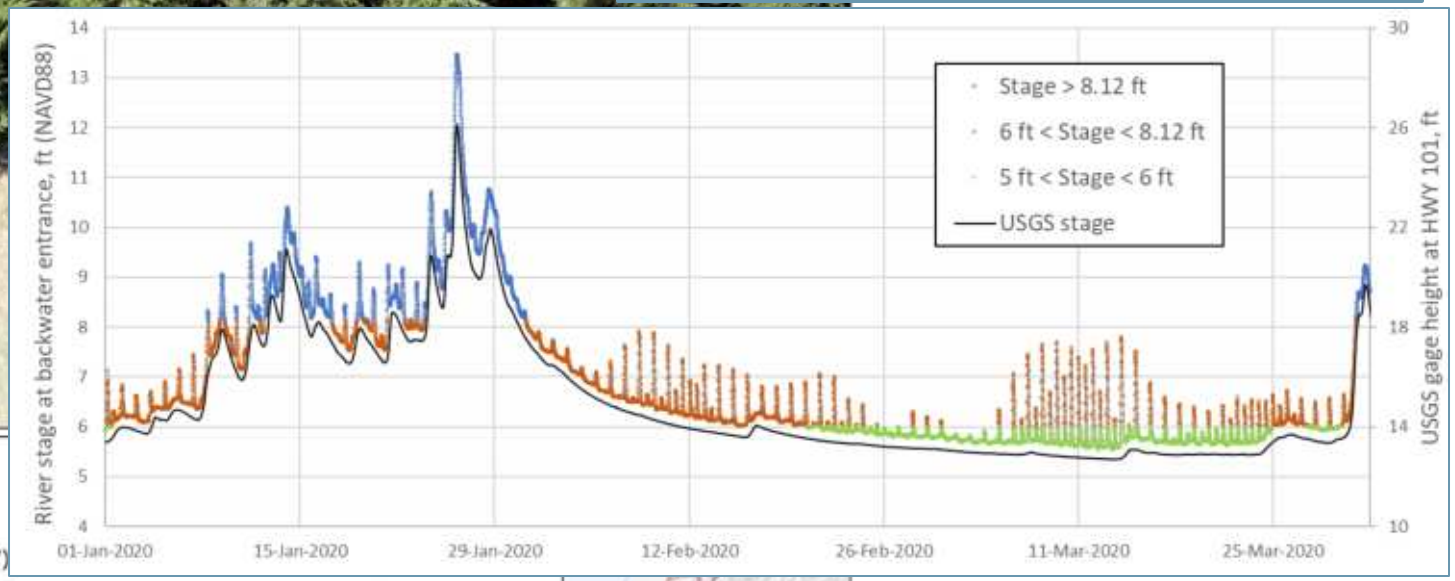



**Table 6-2.** Duration of flow-elevation ranges during water year 2020

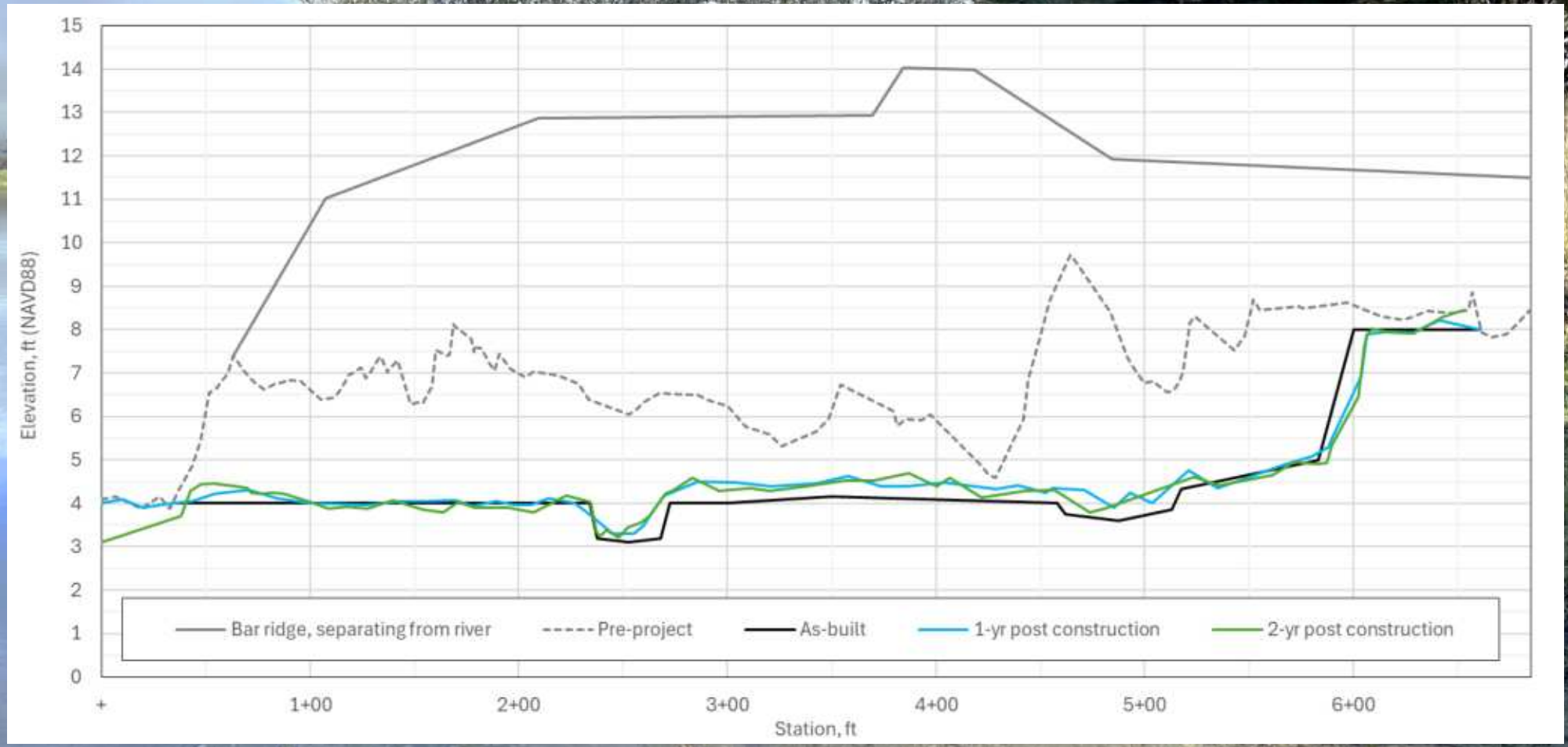
| Water surface elevation range, ft (NAVD 88)[1] | Days[2] |
|---|---|
| Stage > 8.12 ft | 21 |
| Stage > 6 ft | 147 |
| Stage > 4 ft | 365 |

Notes:
[1] Recorded in the river at the backwater entrance.
[2] Total sum of days in period of record (October 11, 2019 through October 10, 2020).



# TIDAL INFLUENCE

- Sediment transport



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