Update on Locks and Dams
Fish Passage Efforts
Lock and Dam #1

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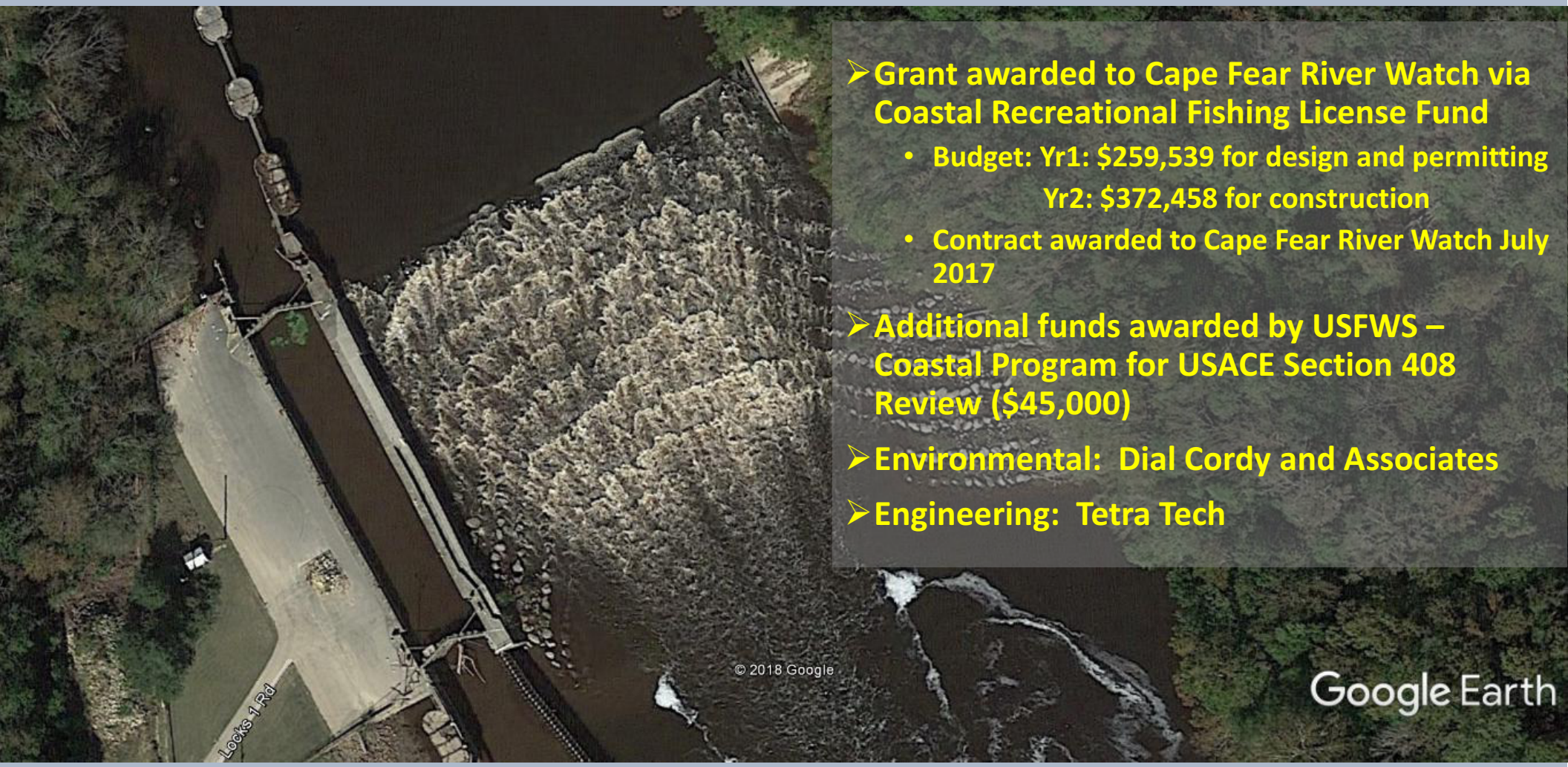
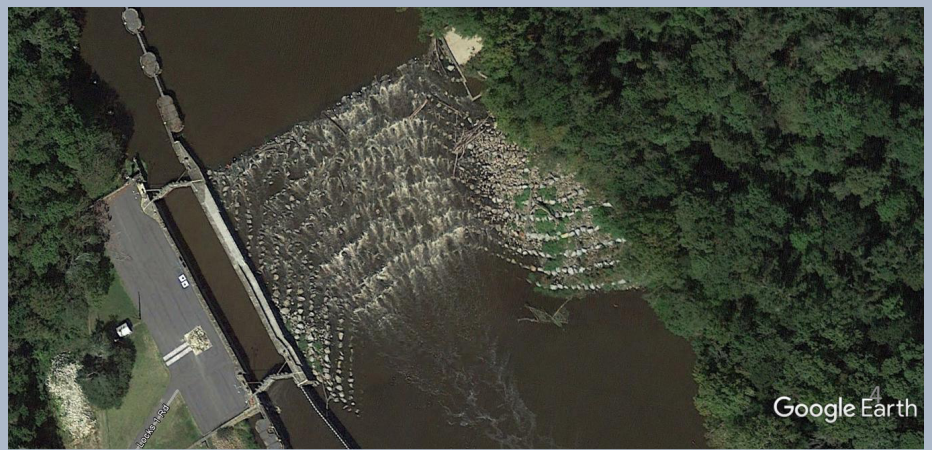


- **Grant awarded to Cape Fear River Watch via Coastal Recreational Fishing License Fund**
  - **Budget: Yr1: $259,539 for design and permitting**
    Yr2: $372,458 for construction
  - **Contract awarded to Cape Fear River Watch July 2017**
- **Additional funds awarded by USFWS – Coastal Program for USACE Section 408 Review ($45,000)**
- **Environmental: Dial Cordy and Associates**
- **Engineering: Tetra Tech**

- Reason for Improvement
  - Striped Bass passage did not meet 80% goal
  - ~20% of Striped Bass Passed, ~50% via locking
- However for shad
  - Before fish passage at Lock and Dam #1, >90% of shad eggs below #1
  - After fish passage at #1, >90% of shad eggs below Lock and Dam #2

Altering a Corps of Engineers Facility

- Section 408 Process
- The section 408 process is required by the Corps of Engineers (Corps) when a non-federal entity requests permission to alter one of their projects.
  - In this case, alteration would be to the existing fish passage structure at Lock and Dam #1 to improve striped bass passage.
  - Section 408 process initiated in August 2017 shortly after contract award.



Corps of Engineers Disposition Study

- However before the section 408 process could proceed very far, the Corps initiated the disposition study in the fall of 2017.
  - Funding for disposition study sought for over a decade
  - The Corps advised CFRW in a December 5, 2017 meeting with the L&D #1 project team that
    - 408 review could probably not be completed until the disposition study was completed
    - Minimum time of 12 to 18 months for the study is expected
    - This decision has been reaffirmed several times since then

Disposition Study

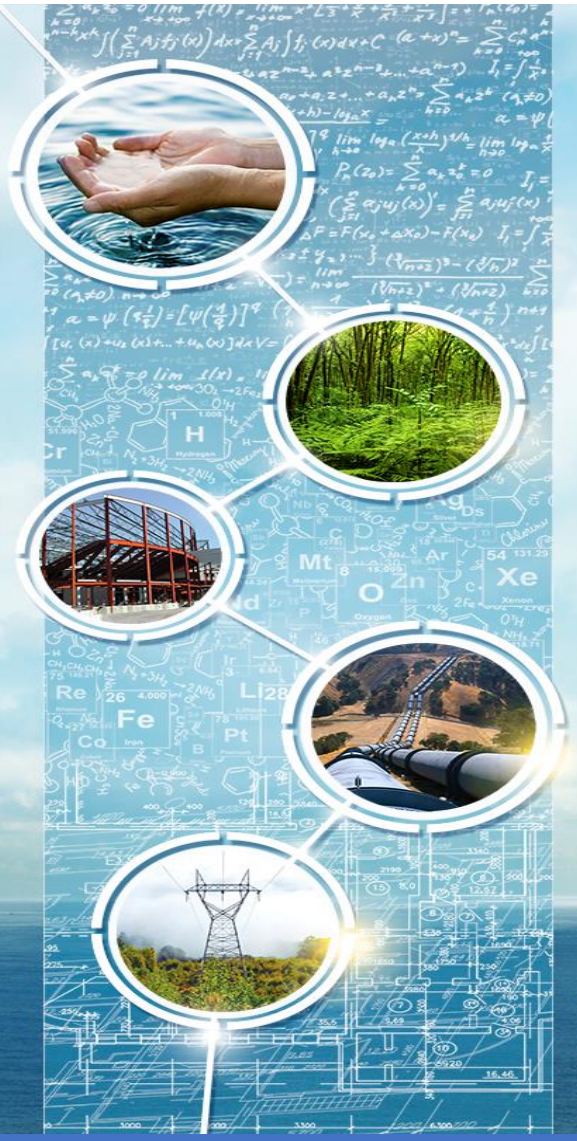
- The purpose of the disposition study is to determine the fate of the locks and dams. For example:
  - The study could determine that the locks and dams should continue to be operated as normal
  - Turned over to another entity,
  - Modified,
  - Removed or
  - some other fate
  - Basically the Corps would like for an entity to take them over

Alternatives for Lock and Dam #1

- Dam Removal. Not likely due to
  - Water supply
  - Existing rock rapids
- Modification to existing rock rapids
  - Three alternatives: left bank, right bank, and center modification.
- Modeling:
  - Modeling of the 3 alternatives in process.
    - average flows of 5,000cfs,
    - high flows of 8,800cfs and
    - low flows (<1,000cfs)
- Engineering:
  - Preliminary design of selected alternative mid-summer

Accomplishments to date

- Because of delays due to Disposition study,
  - We anticipate approximately 55-60% of year-1 funds to be expended by June 30, 2018.
  - We have requested and received a 1-year extension of funding
- The following items are what have been or we expect to be accomplished through June 30th:
  - Literature Review and Existing Date Collection
  - Lidar survey of the existing Lock and Dam #1 fish passage structure
  - Hydraulic modeling and analyses of fish passage alternatives
  - Alternative analysis and selection of the proposed alternative
  - Preliminary draft environmental assessment (EA)
  - Draft fish passage design
- By the end of the 1-year extension, we will be ready to start the construction phase with year 2 funding.



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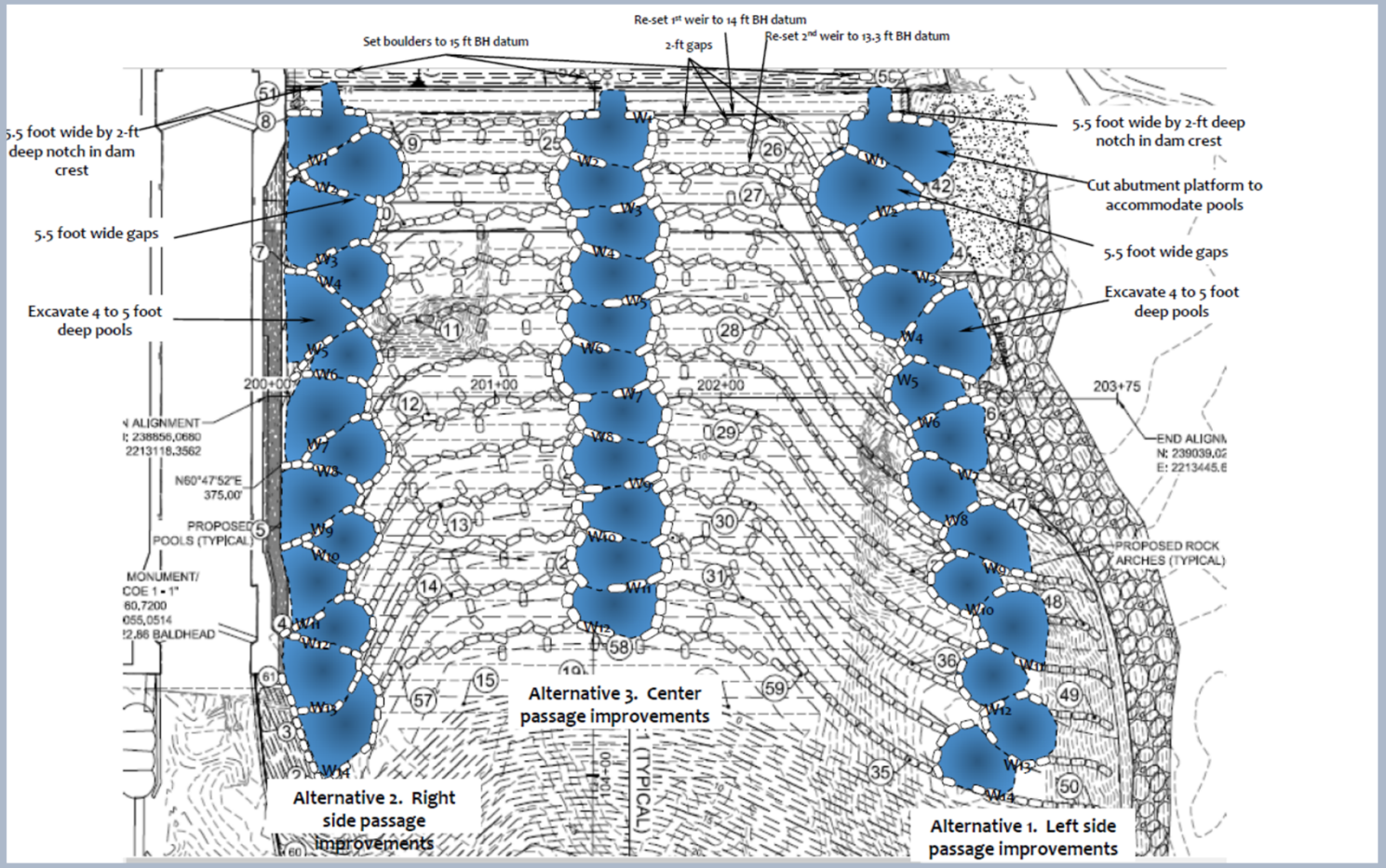
Fish passage upgrade alternatives

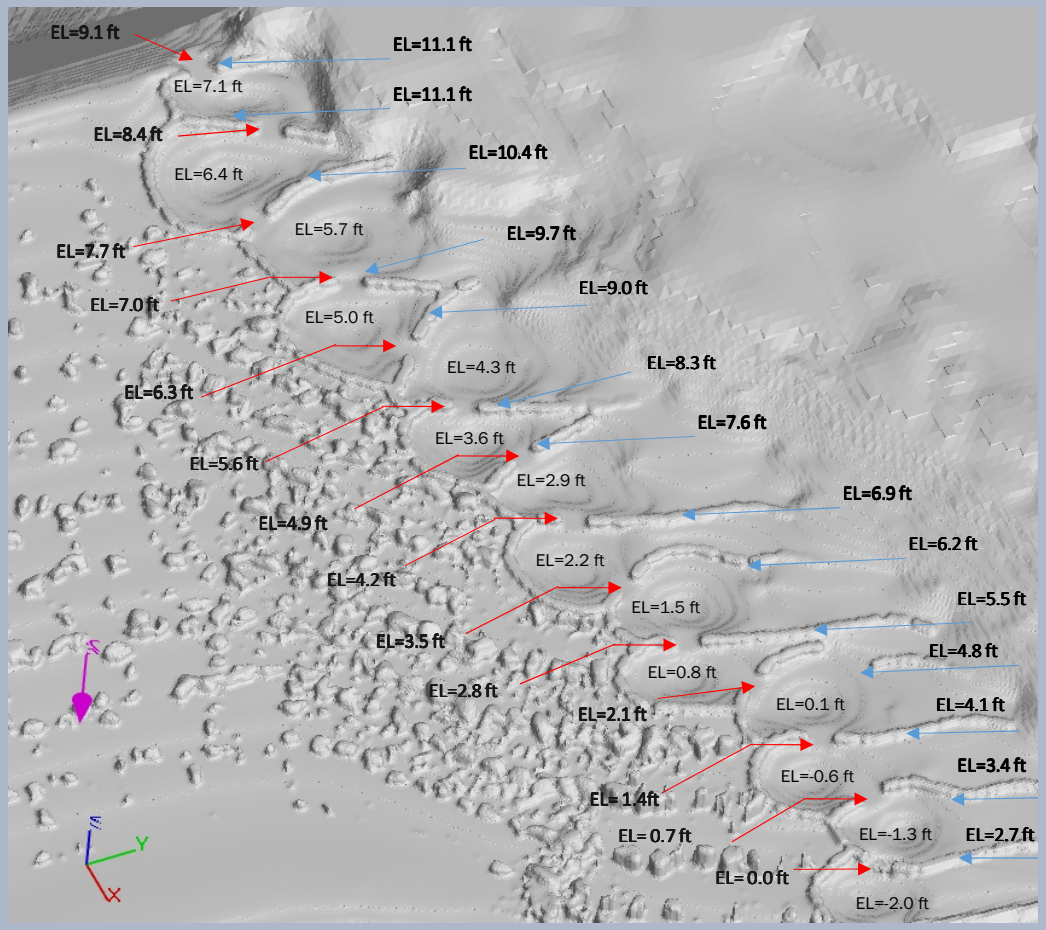
FISH PASSAGE UPGRADE ALTERNATIVES



ALTERNATIVE 1 - LEFT SIDE PATHWAY MODEL SETUP

CFD Model Representation of Alternative 1

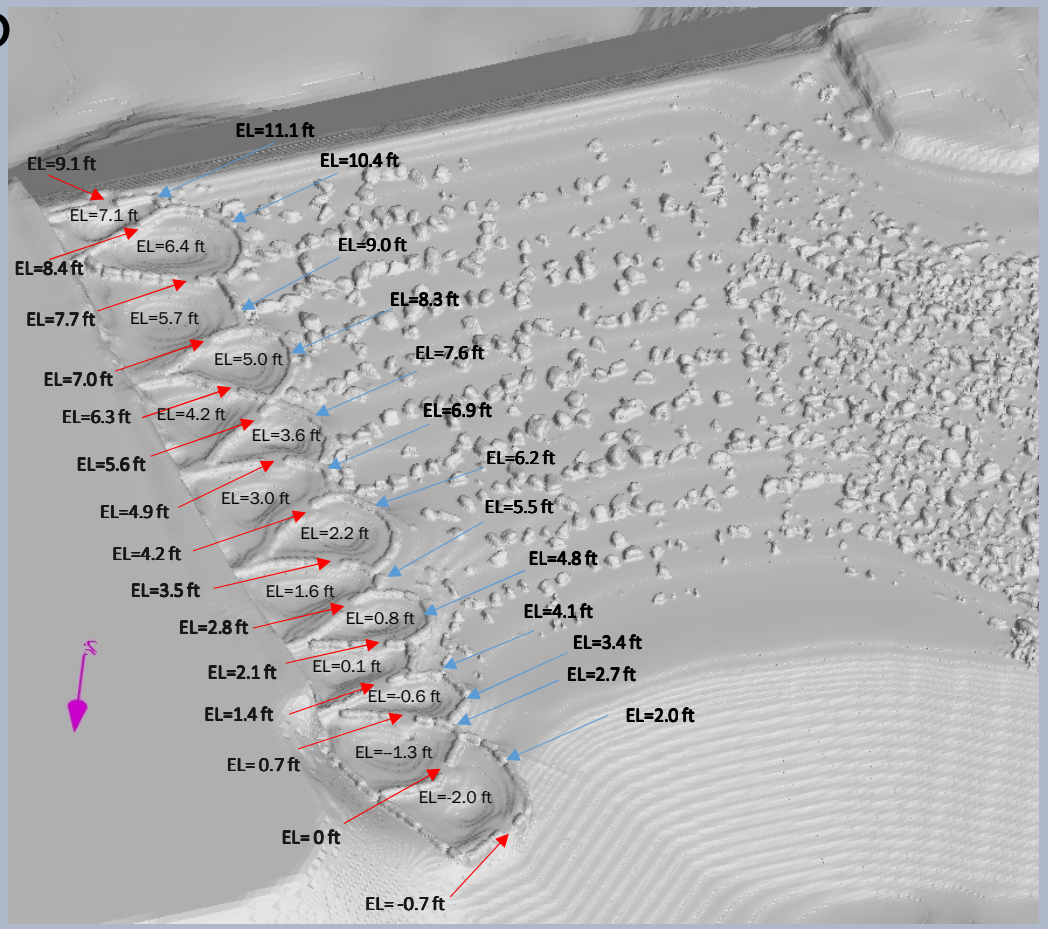
- 2.0 ft notch at dam crest
- 5.5 ft wide gaps
- 4 – 5 deep pools
- Elevations in feet (NAVD29)



ALTERNATIVE 2 – RIGHT SIDE PATHWAY MODEL SETUP

CFD Model Representation of Alternative 2

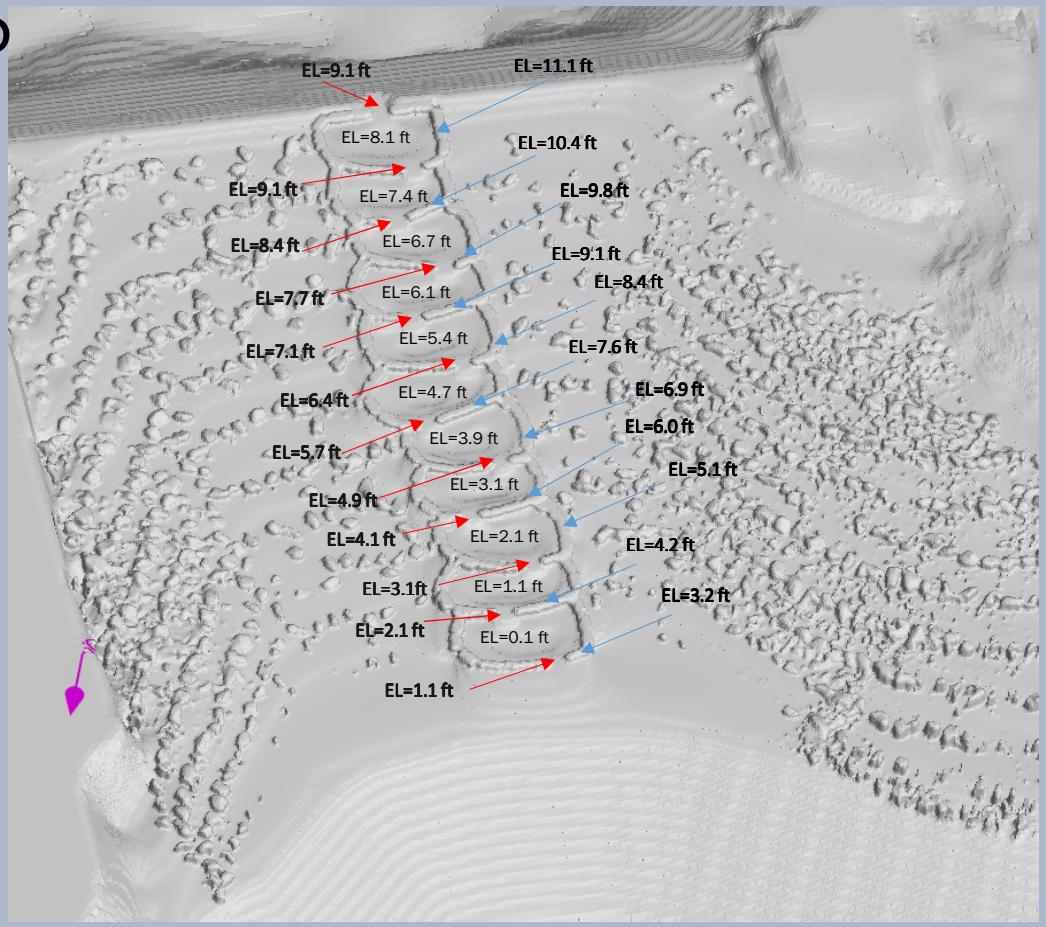
- 2.0 ft notch at dam crest
- 5.5 ft wide gaps
- 4 – 5 deep pools
- Elevations in feet (NAVD29)



ALTERNATIVE 3 – RIGHT SIDE PATHWAY MODEL SETUP

CFD Model Representation of Alternative 3

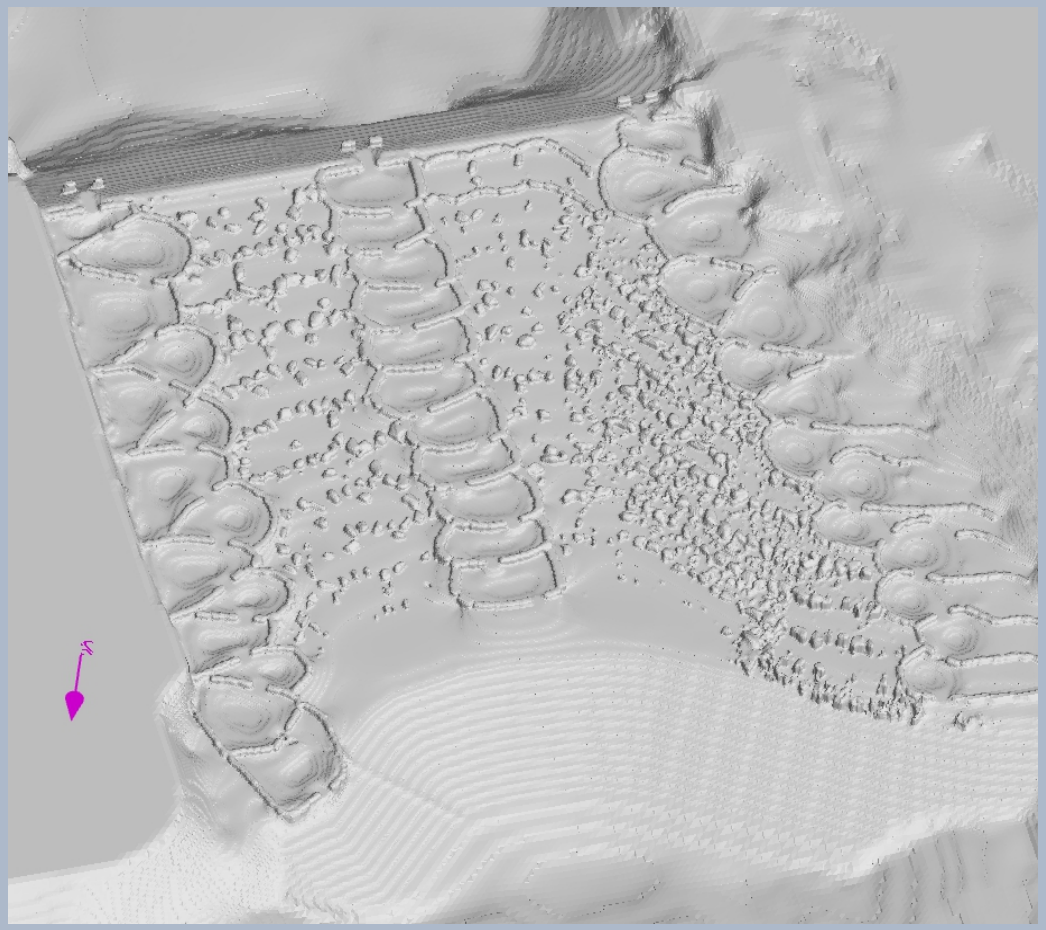
- 2.0 ft notch at dam crest
- 5.5 ft wide gaps
- 4 – 5 deep pools
- Elevations in feet (NAVD29)

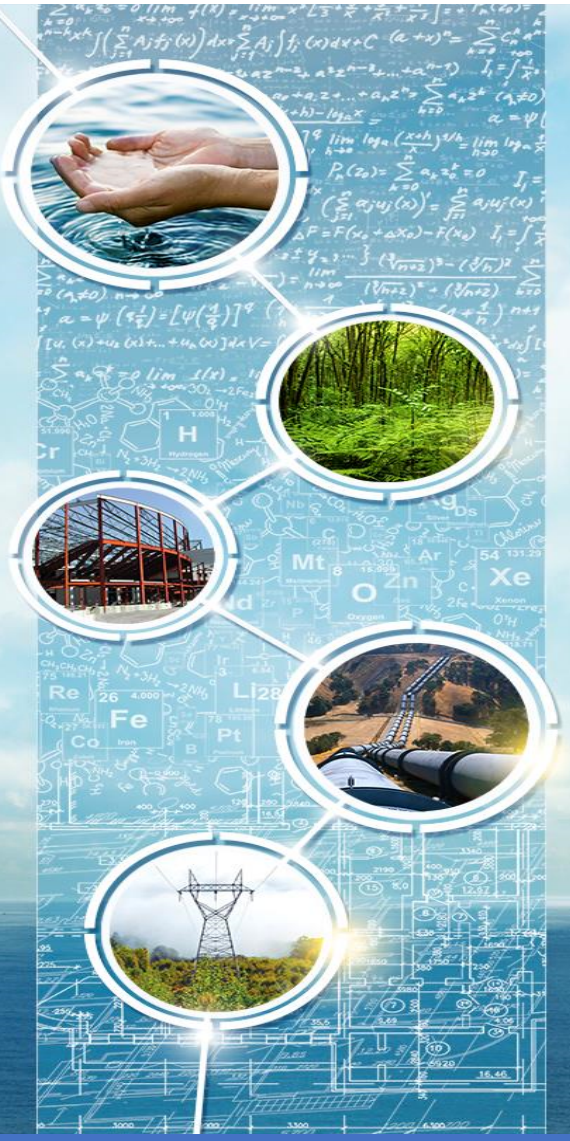


ALTERNATIVE 4 – COMBINED ALTERNATIVES 1 – 3

CFD Model Representation
Combined Alternatives 1-3

- 2.0 ft notch at dam crest
- 5.5 ft wide gaps
- 4 – 5 deep pools
- Elevations in feet (NAVD29)





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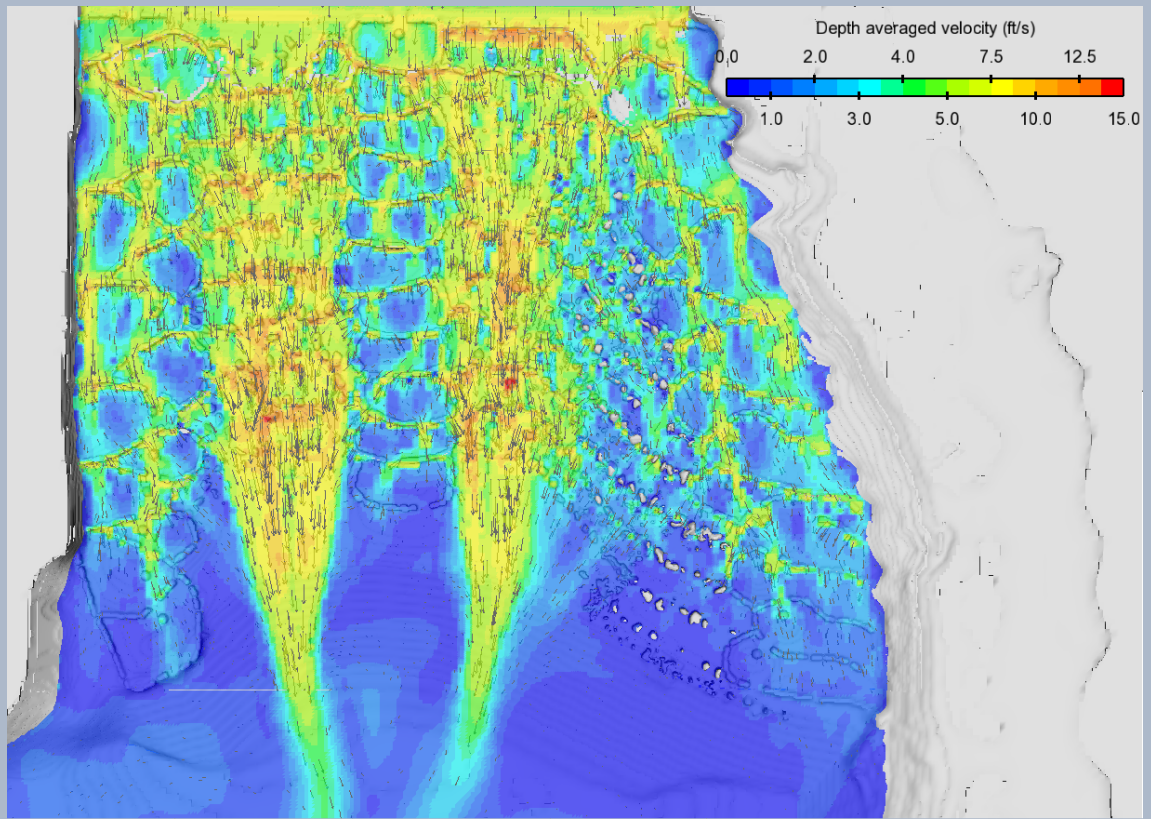
Simulation Results Combined Alternatives 1-3. Q=5000 cfs

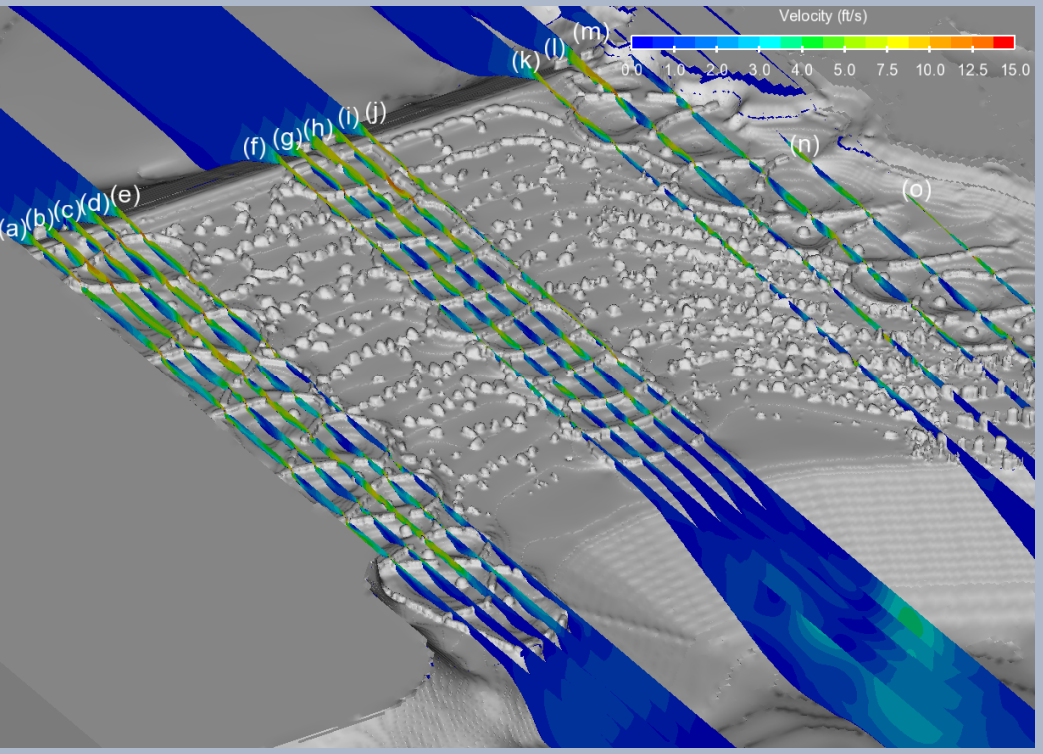
FISH PASSAGE UPGRADE ALTERNATIVES ALTERNATIVE 1-3 MODEL RESULTS

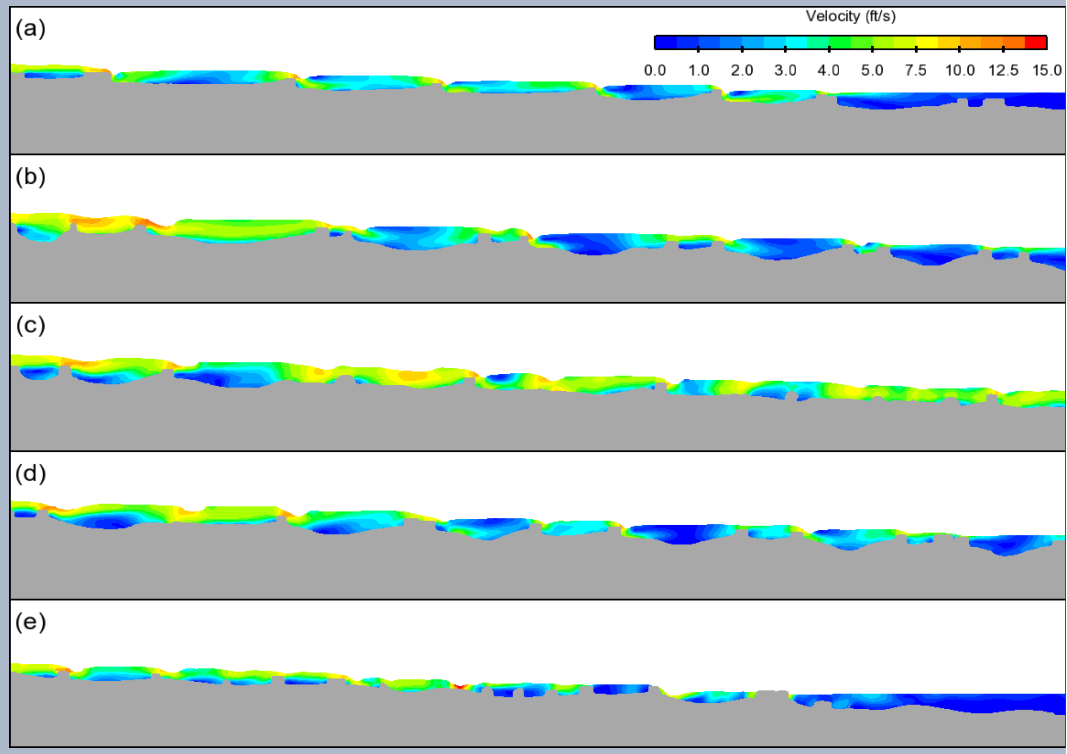
Plan View – Depth Averaged Velocity Q=5,000 cfs.



FISH PASSAGE UPGRADE ALTERNATIVES
ALTERNATIVE 1-3 MODEL RESULTS

Velocity Profiles Q=5,000 cfs





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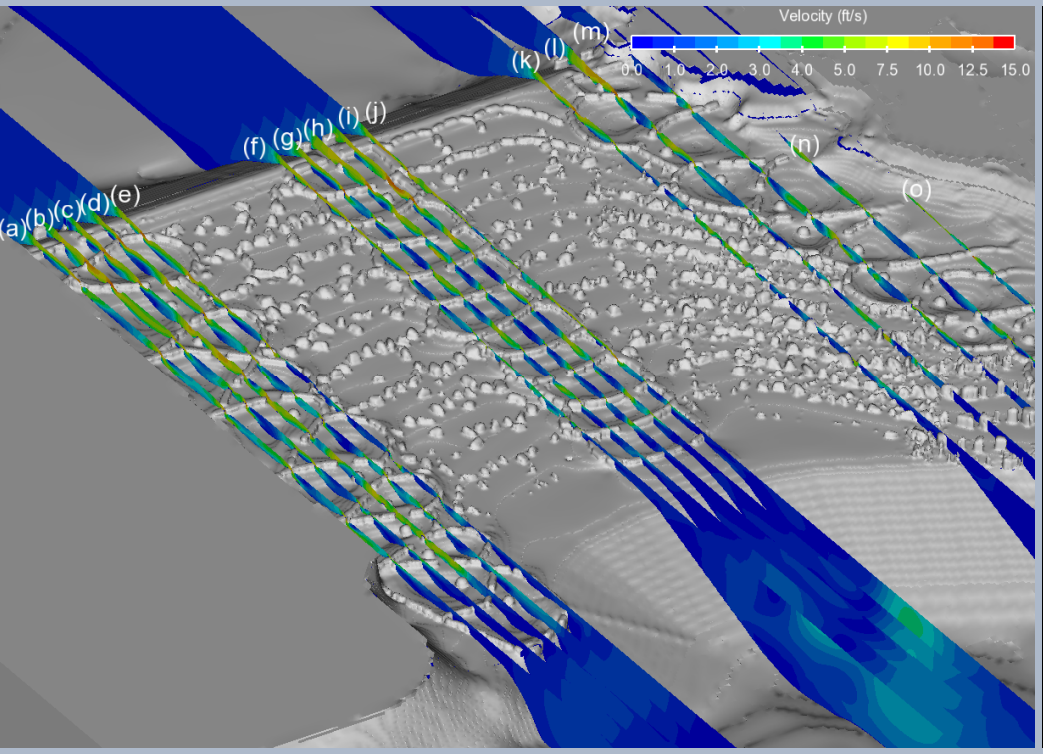
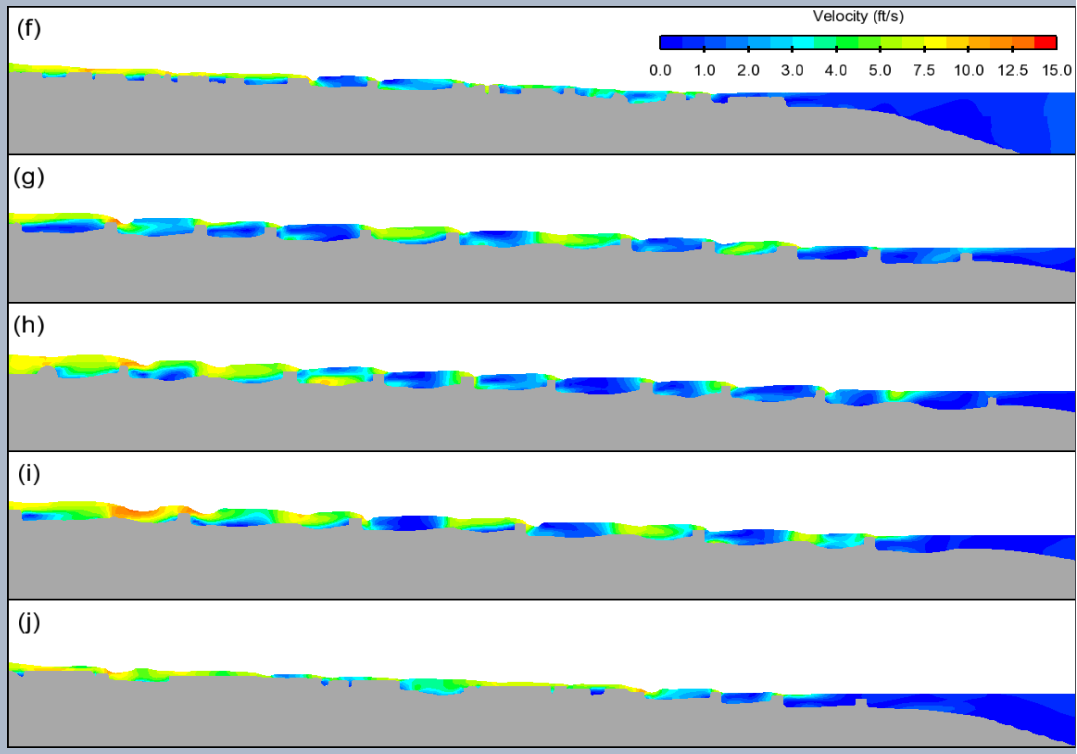
ALTERNATIVE 1-3 MODEL RESULTS

Velocity Profiles Q=5,000 cfs





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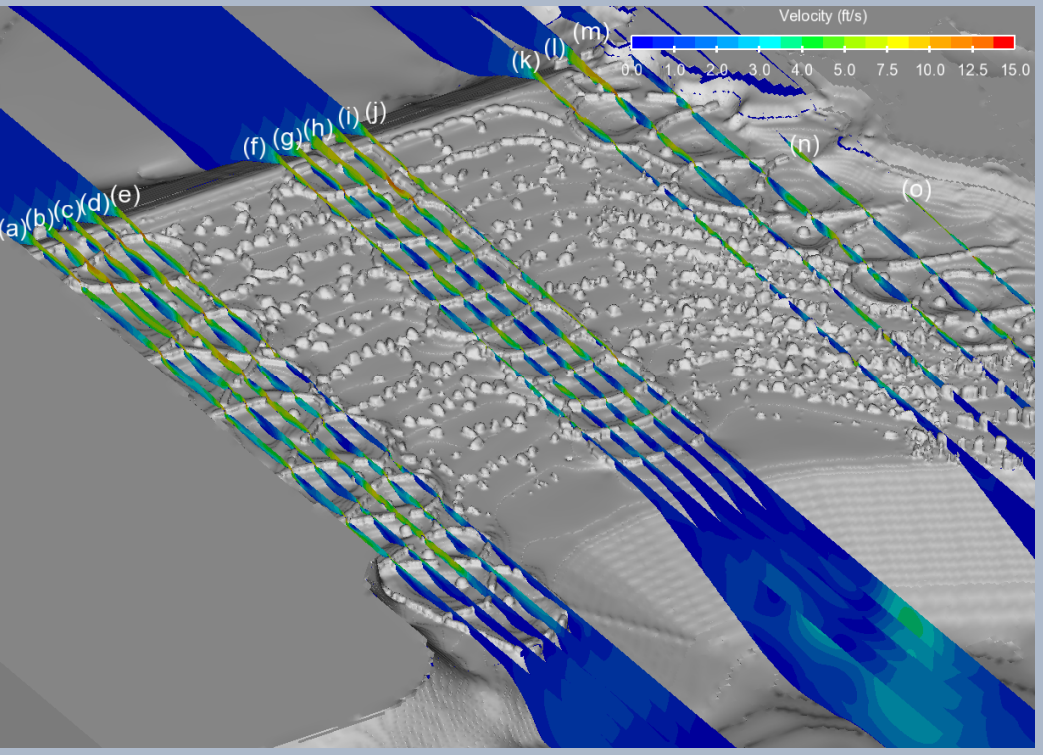

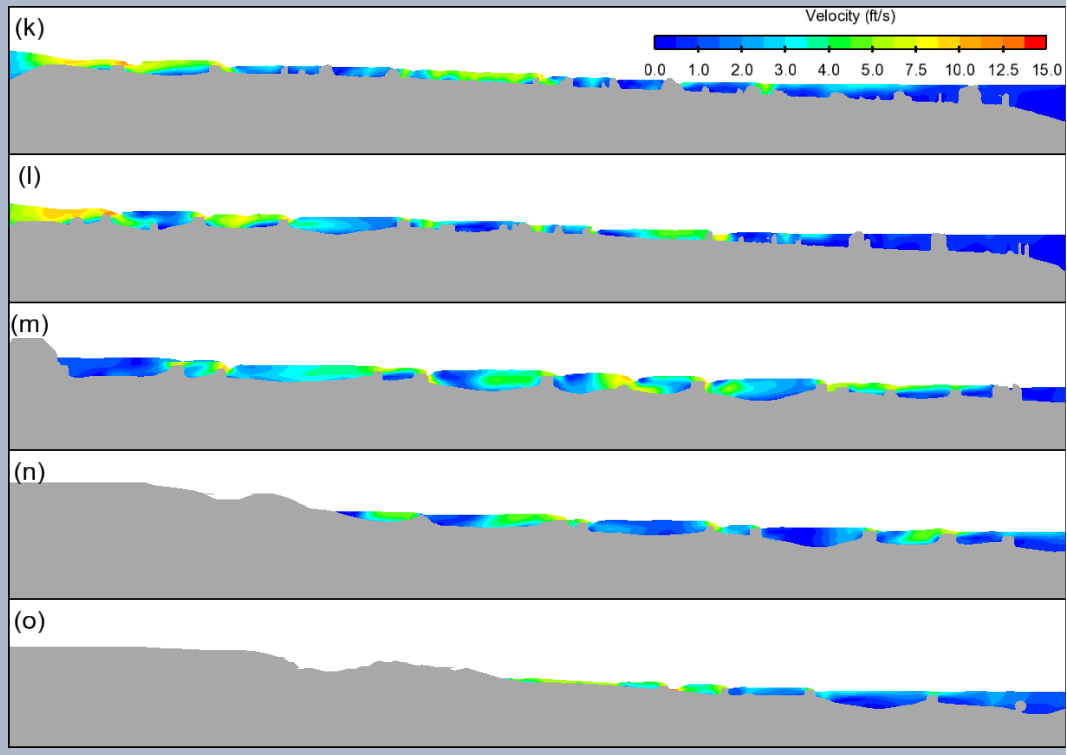

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Questions?