

**CTF *Structured Invitation to Outside Experts* in relation to current modeling results and how the Draft Supplemental Environmental Impact Statement (DSEIS) may deal with them**

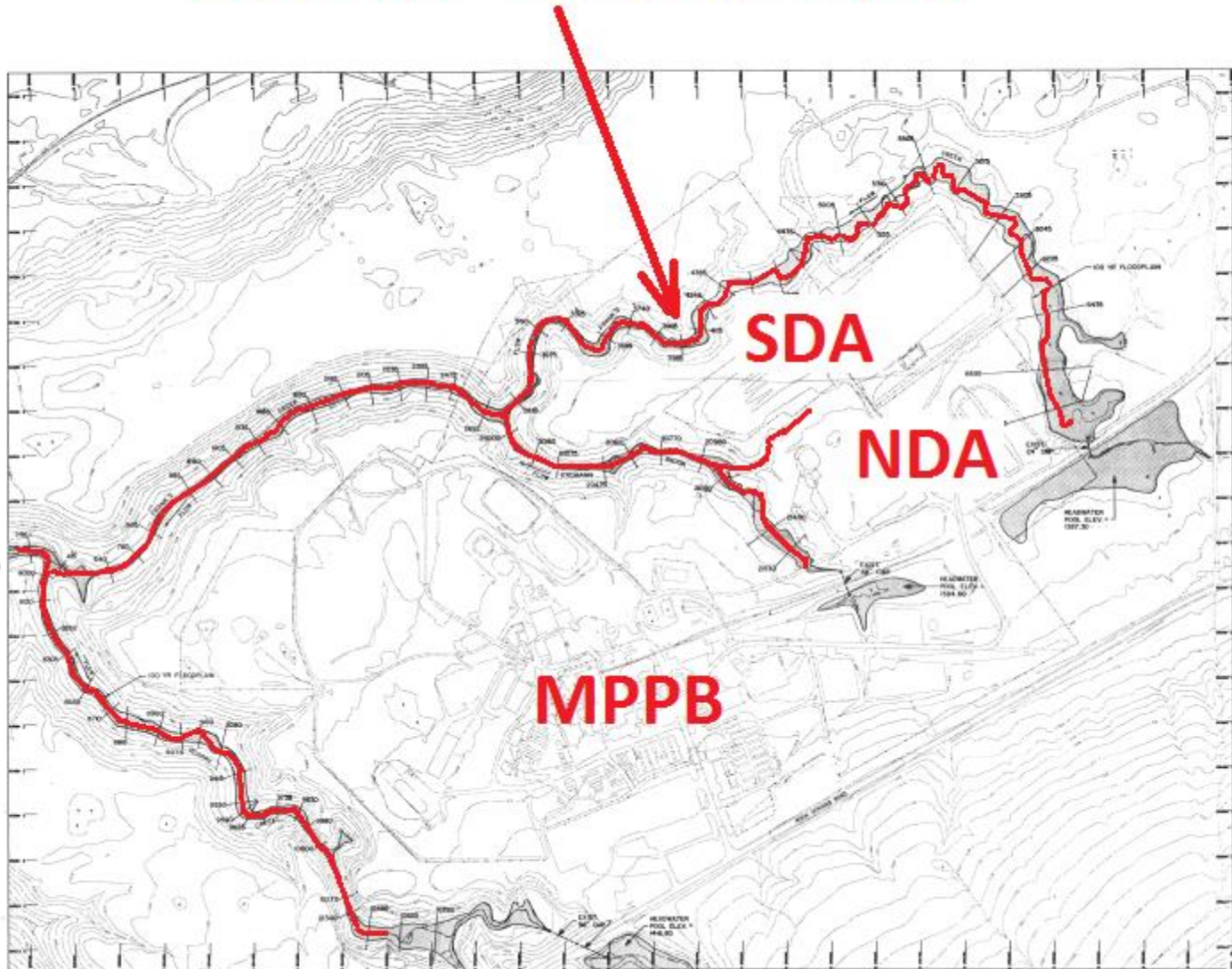
**Raymond C. Vaughan, Ph.D., P.G.**

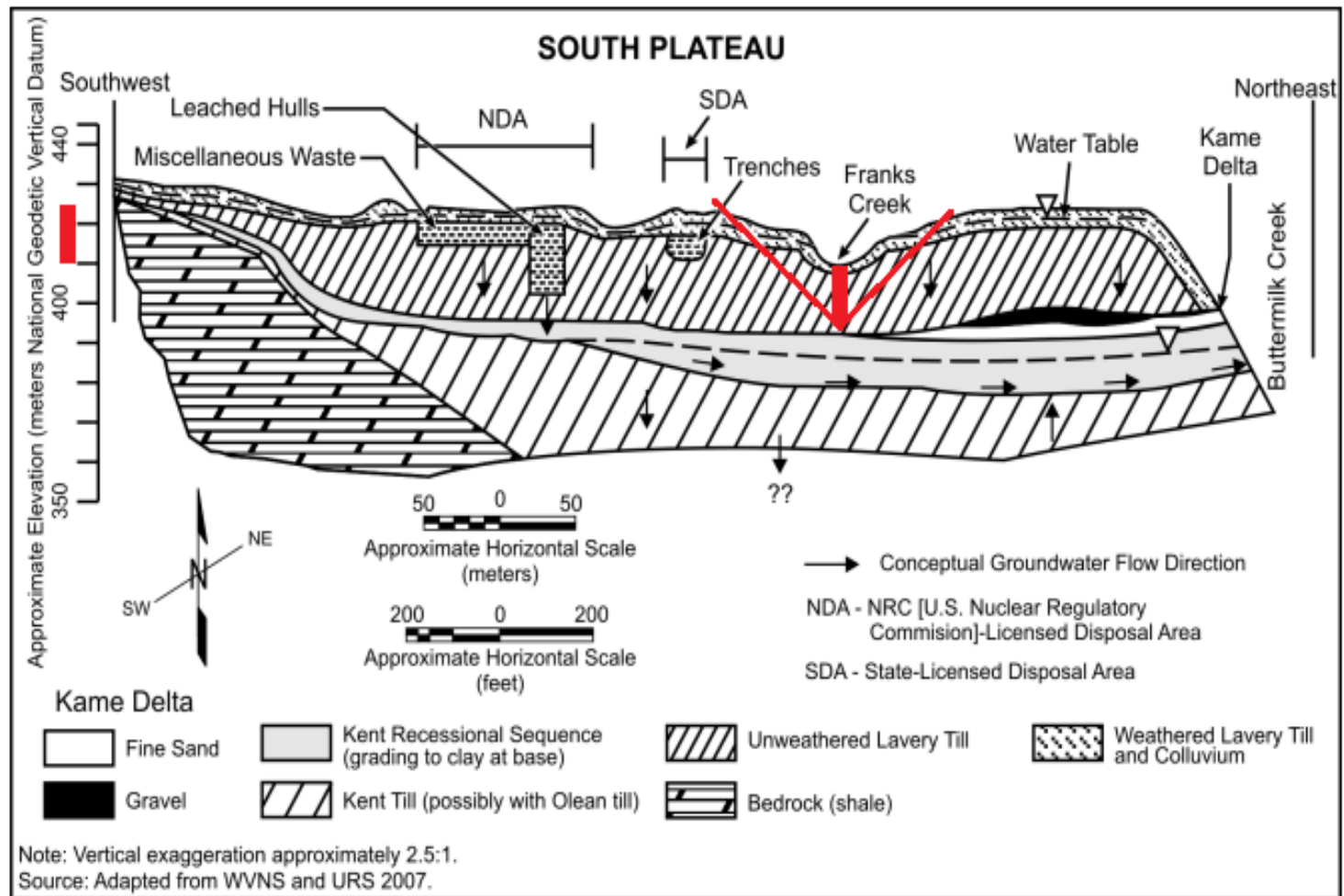
**September 28, 2022**

**The State-Licensed Disposal Area (SDA) trenches are particularly susceptible to erosional release of wastes and causing downstream contamination.**

**This brief review will look at the SDA as an example – but other onsite wastes are likewise at risk of erosional release and causing downstream contamination**

# Meander in Franks Creek





**Adapted from 2010 EIS, Figure E-6 Geologic Cross-section through the South Plateau**

Vertical red bar shows 50 foot (15 m) Franks Creek downcutting alongside SDA at about  $42.4495^{\circ}$ ,  $-78.6490^{\circ}$ , more or less as predicted by EWG erosion modeling by Tucker & Doty.

Diagonal red lines show  $21^{\circ}$  stable slope angle, adjusted here to match vertical exaggeration.

**This figure is approximate and illustrative, not exact.**

**21° stable  
slope angle**

Ground  
surface

**SDA**

**Reach 1 (Neptune's R-1) on Franks Creek**

**Creek meandering toward the SDA**

**Between cross-sections 3985 and 4115  
as defined in Hydrology EID**

**About 42.4495°, -78.6490° (lat-long)**

**Landscape Evolution Model, despite its  
issues, shows about 50 feet downcutting**

1400'

Creek  
level  
now

1334.5'

Downcut  
50 feet

1300'

1284.5'

1200'

**Current creek  
centerline**

500' 483'

163'

105'

76'

52'

0

21° stable slope angle

Ground surface

SDA

Reach 1 (Neptune's R-1) on Franks Creek

Creek meandering toward the SDA

Between cross-sections 3985 and 4115 as defined in Hydrology EID

About 42.4495°, -78.6490° (lat-long)

Landscape Evolution Model, despite its issues, shows about 50 feet downcutting

\*

\* Lost due to downcutting

1400'

Creek level now

1334.5'

Downcut 50 feet

1300'

1284.5'

1200'

Current creek centerline

500' 483'

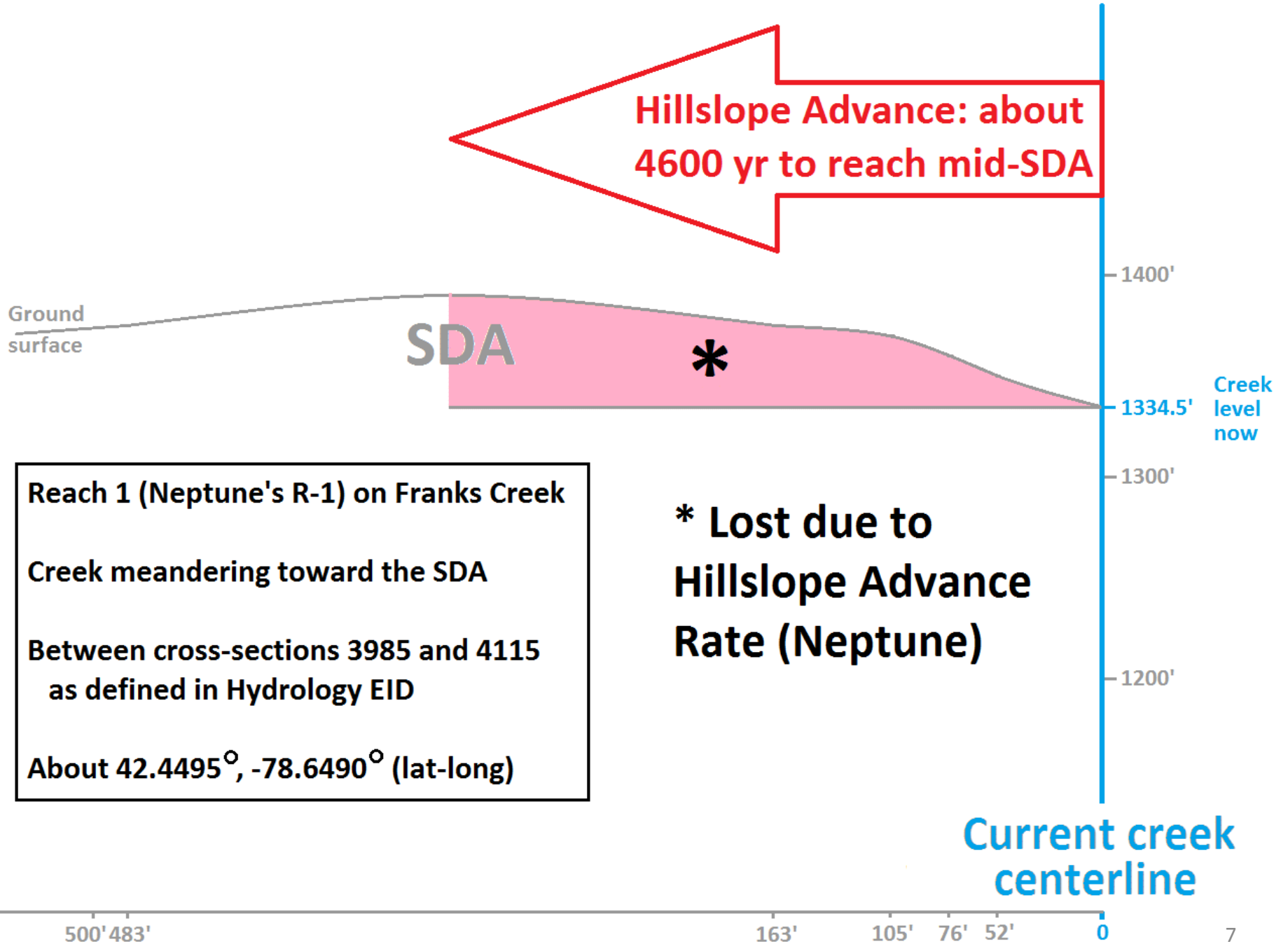
163'

105'

76'

52'

0



# WITH CLIMATE CHANGE

Hillslope Advance: about  
3000 yr to reach mid-SDA

Ground  
surface

SDA

\*

1400'

Creek  
level  
now

1334.5'

1300'

\* Lost due to  
Hillslope Advance  
Rate (Neptune)

1200'

Reach 1 (Neptune's R-1) on Franks Creek

Creek meandering toward the SDA

Between cross-sections 3985 and 4115  
as defined in Hydrology EID

About 42.4495°, -78.6490° (lat-long)

Current creek  
centerline

500' 483'

163'

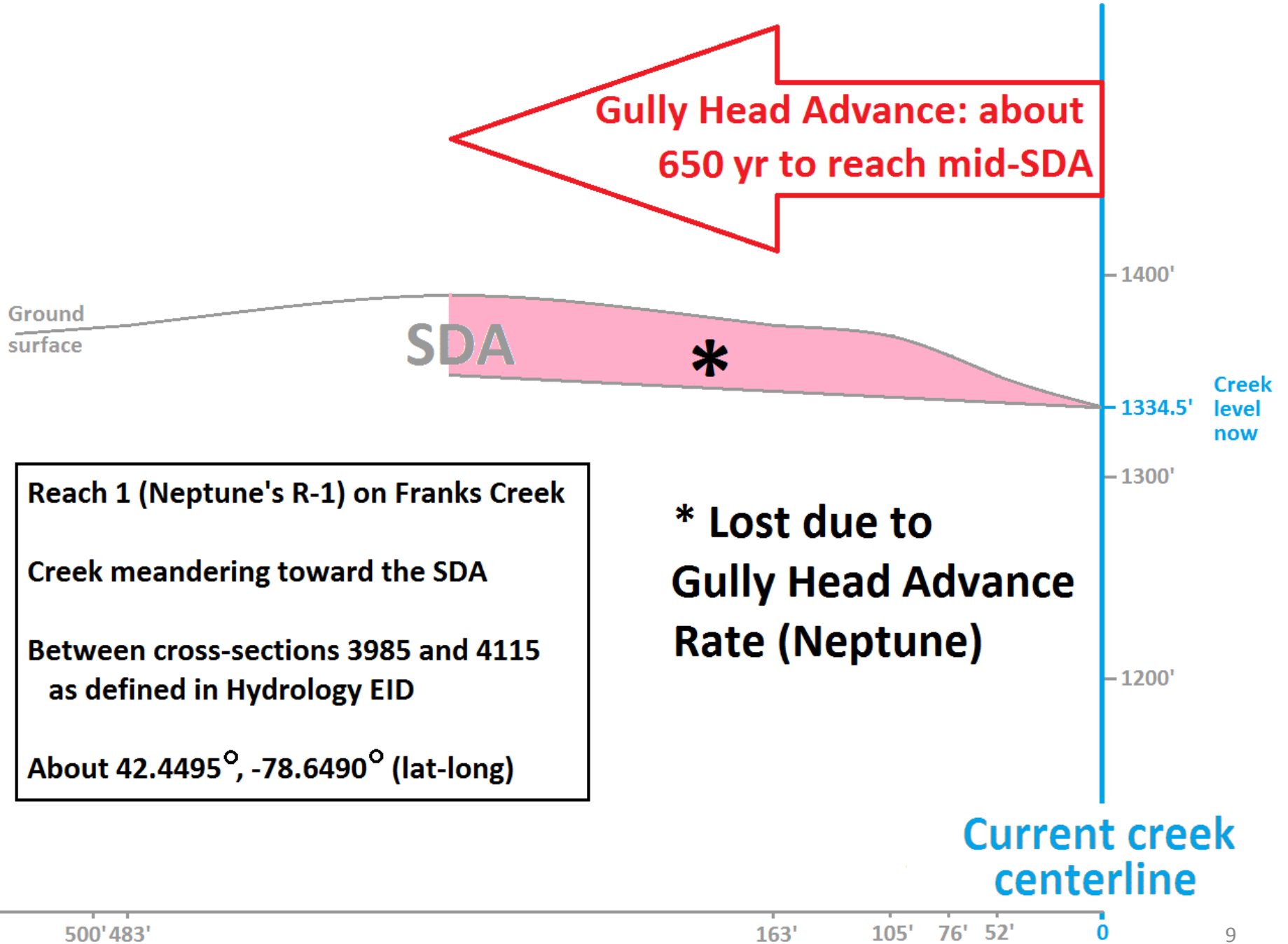
105'

76'

52'

0





# WITH CLIMATE CHANGE

Gully Head Advance: about  
540 yr to reach mid-SDA

Ground  
surface

SDA

\*

1400'

Creek  
level  
now

1334.5'

1300'

\* Lost due to  
Gully Head Advance  
Rate (Neptune)

1200'

Reach 1 (Neptune's R-1) on Franks Creek  
Creek meandering toward the SDA  
Between cross-sections 3985 and 4115  
as defined in Hydrology EID  
About 42.4495°, -78.6490° (lat-long)

Current creek  
centerline

500' 483'

163'

105'

76'

52'

0

10

**Neptune's work shows SDA being breached in less than 1000 years by Gully Head Advance and less than 10,000 years by Hillslope Advance.**

**How may the Draft Supplemental Environmental Impact Statement (DSEIS) deal with this?**

**Likely agency ideas for leaving some wastes in place:**

**1. Partial exhumation (digging up sections of SDA trenches that are thought to be most highly contaminated, leaving other sections in place)**

**2. Designing & installing engineered barriers to protect the SDA, NDA, and other facilities from erosion**

**Likely problems with partial exhumation (digging up sections of trenches that are thought to be most highly contaminated, leaving other sections in place):**

- Are the burial records accurate?**
- Has water in the trenches redistributed the contamination?**
- When erosion releases contamination from the remaining wastes, are the exposures acceptable to downstream communities even if exposures are less than 25 millirems per year?**

# **Likely problems with engineered barriers and their ability to protect against erosion:**

- Erosion typically bypasses and undercuts engineered barriers**
- Repair and replacement can't be relied on or assumed beyond a 100-year institutional control period**
- During the period (~100 years) when engineered barriers can be repaired or replaced, the DSEIS needs to address standard death/injury rates for workers operating equipment on steep slopes**

# **Selected links to the CTF's *Structured Invitation* & its “tasks”**

- **Landscape Evolution Model issues: Tasks 2-7, 14-17, 20-21, etc.**
- **Comparison to prior Neptune work: Task 20**
- **Burial-record accuracy: Task 40**
- **Acceptability of contamination to downstream communities: Tasks 43-46**
- **Assessment of standard death/injury rates for workers operating heavy equipment on steep slopes: Task 37**