

Culvert design methods



No slope, tailwater control



Stream simulation

Culvert design methods

Low gradient: No slope, tailwater control

- Culvert size:
 - Hydrology and hydraulics (H&H)
 - Culvert width \geq bankfull width
- Generally no material placed in culvert
- Culvert set flat with tailwater control



Culvert design methods

High gradient: Stream simulation

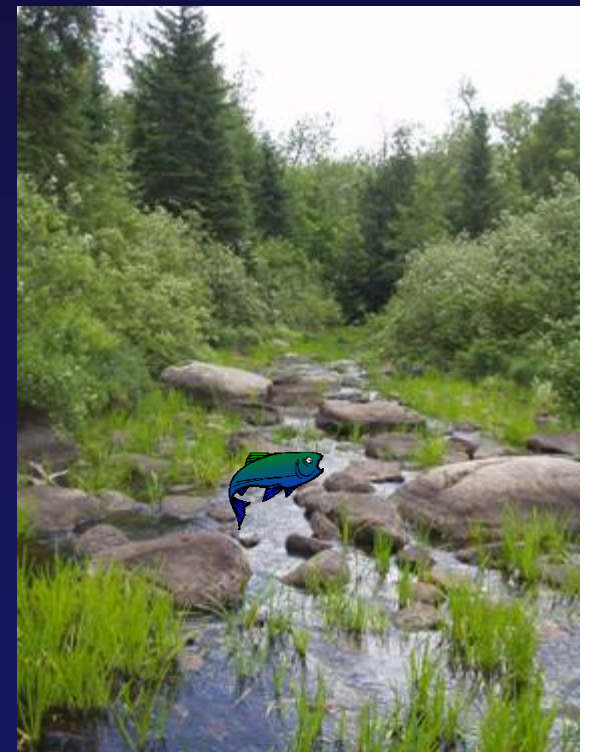
- Culvert width \geq bankfull width
- Natural channel constructed in culvert
- Reference reach (bfiw, slope, bed material)
- Passes all aquatic species and life stages



Stream simulation



- A channel that will present no more of a challenge to organisms than the natural channel.

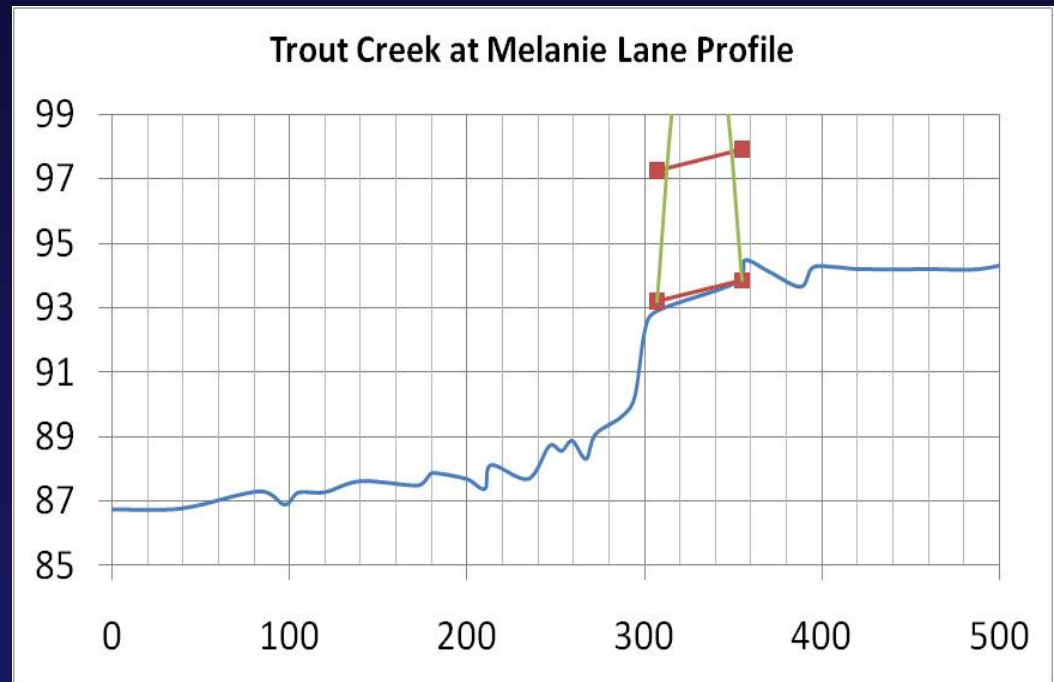


Stream simulation may not provide:

- Riparian functions
- Light
- Lateral channel and floodplain processes
- Passage of some aquatic, semi-aquatic or terrestrial organisms

Stream simulation feasibility

Not suitable for stream simulation



Suitable for stream simulation – most sites

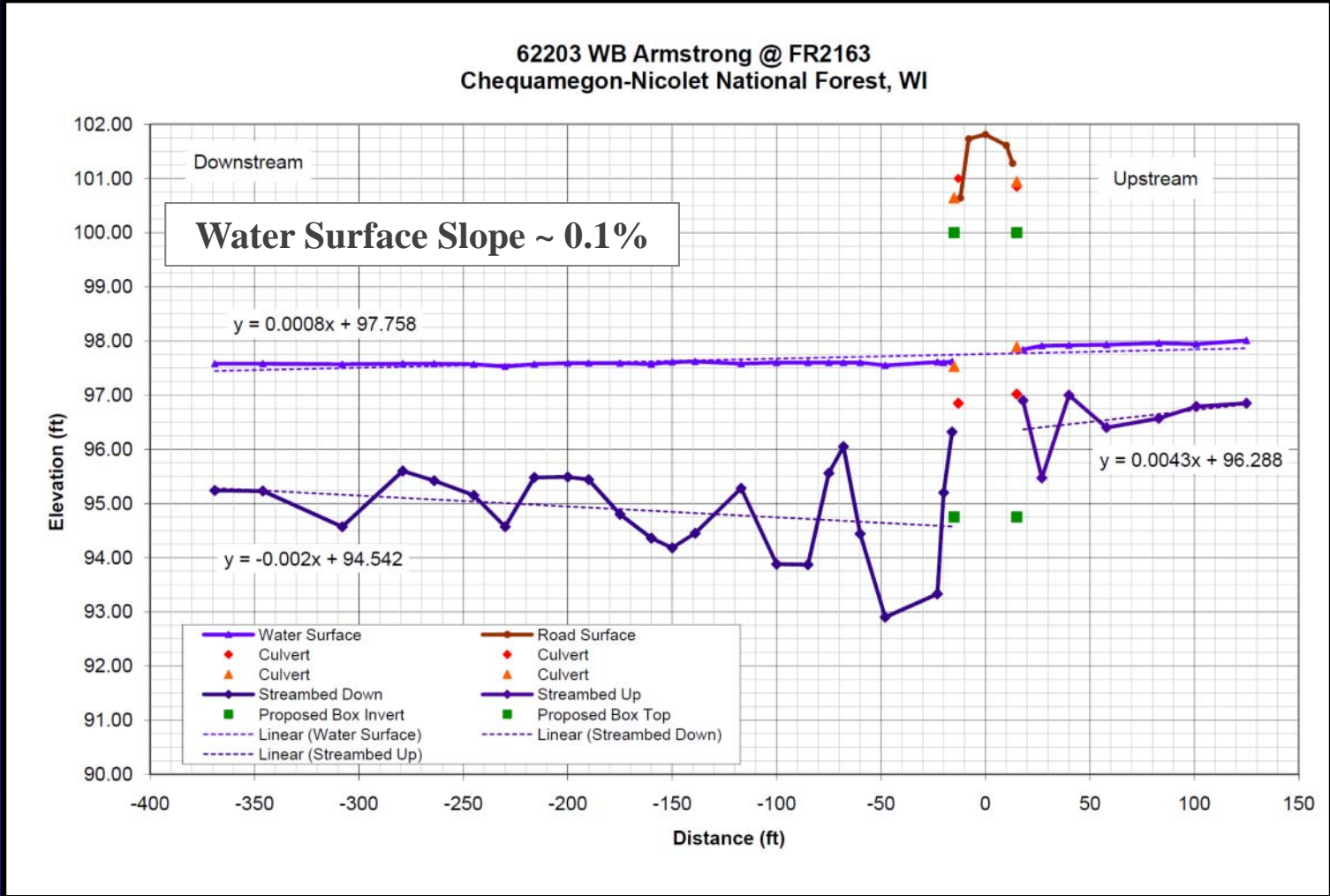


Low vs high gradient

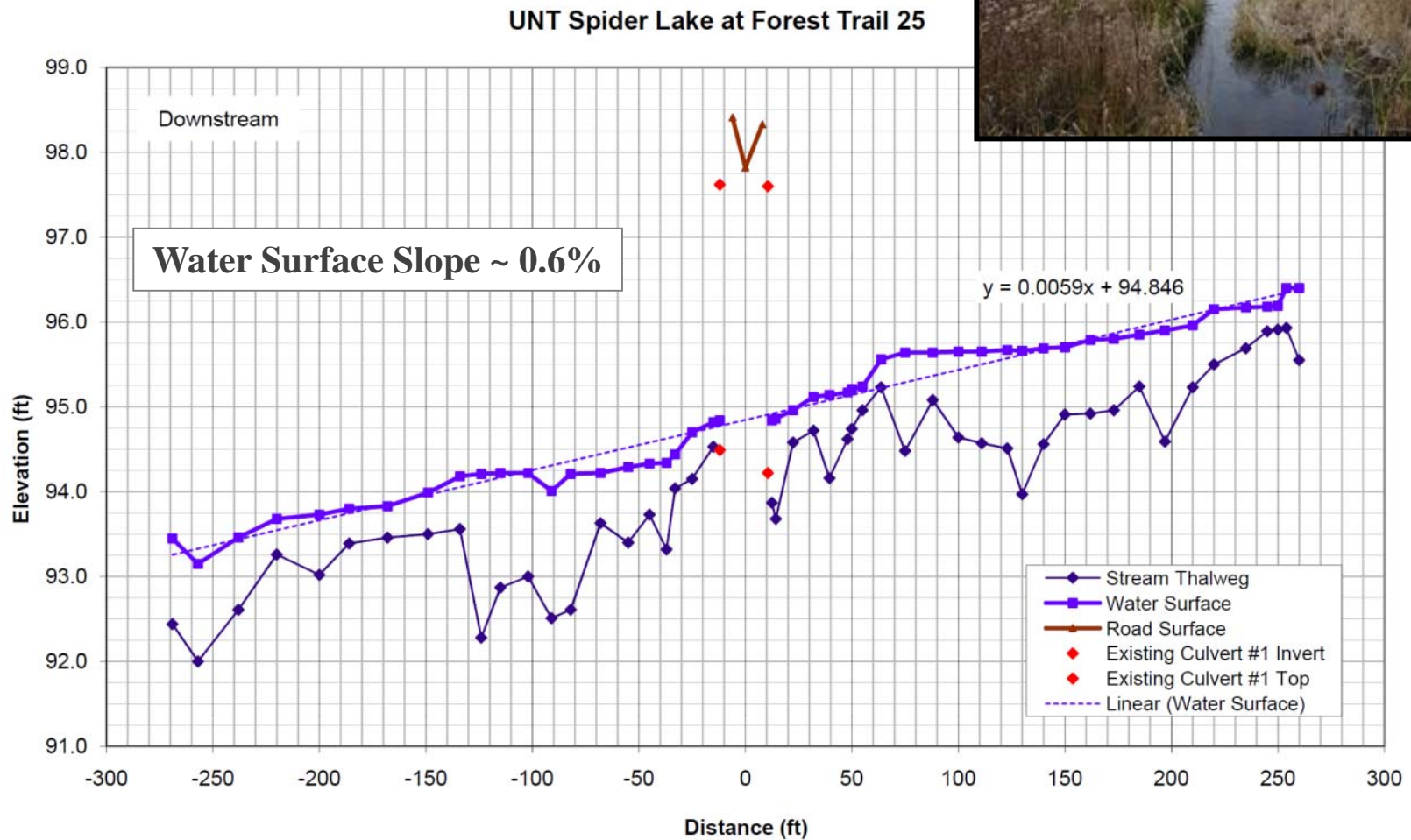
- Low gradient = tailwater control
- Key considerations
 - Channel slope
 - Culvert length (fill ht, skew, side slope)
 - Headcut potential (slope, channel type/material)
 - Prior crossing impacts, channel restoration
- Approximate slope breaks
 - Low gradient < 0.3 percent
 - High gradient > 1.0 percent



Low gradient



Intermediate gradient





High gradient

