Hydrology

Scientific Knowledge Gained

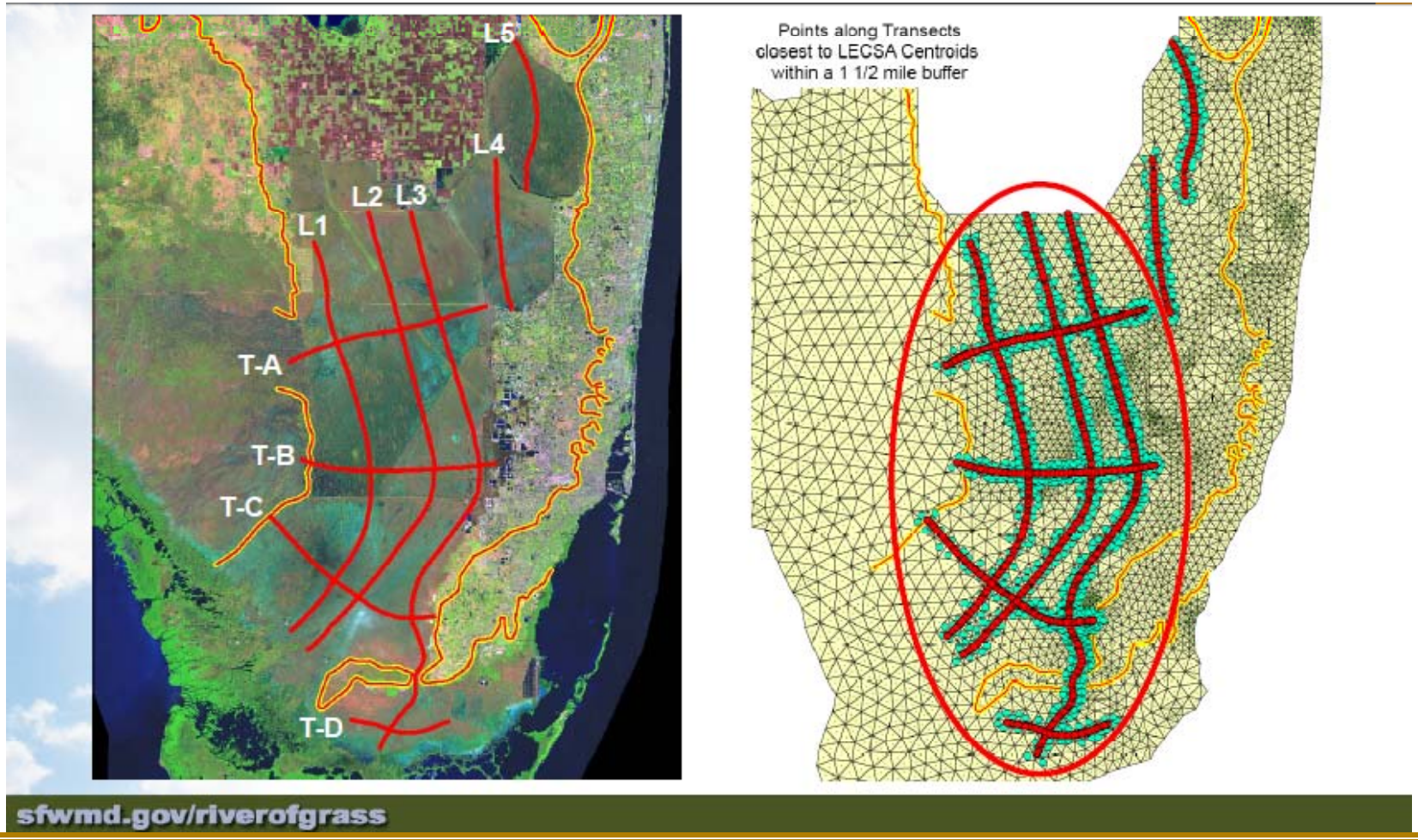
Key Findings

- There is agreement upon hydrological goals for restoration based on three independently developed lines of evidence:
  - Historical Documents (McVoy et al in press)
  - Paleo-ecology reconstruction based on soil cores in peatlands (Willard et al., 2001, 2007; Winkler et al., 2001; Saunders et al., 2006; Bernhardt and Willard, 2009) and estuaries (these cores were coupled with statistical models by Marshall et al., 2008).
  - Observed and simulated velocity conditions in intact ridge and slough (Harvey et al. 2005, 2009, Larsen et al. 2007, 2009a, 2009b, 2009c).

Implications of findings

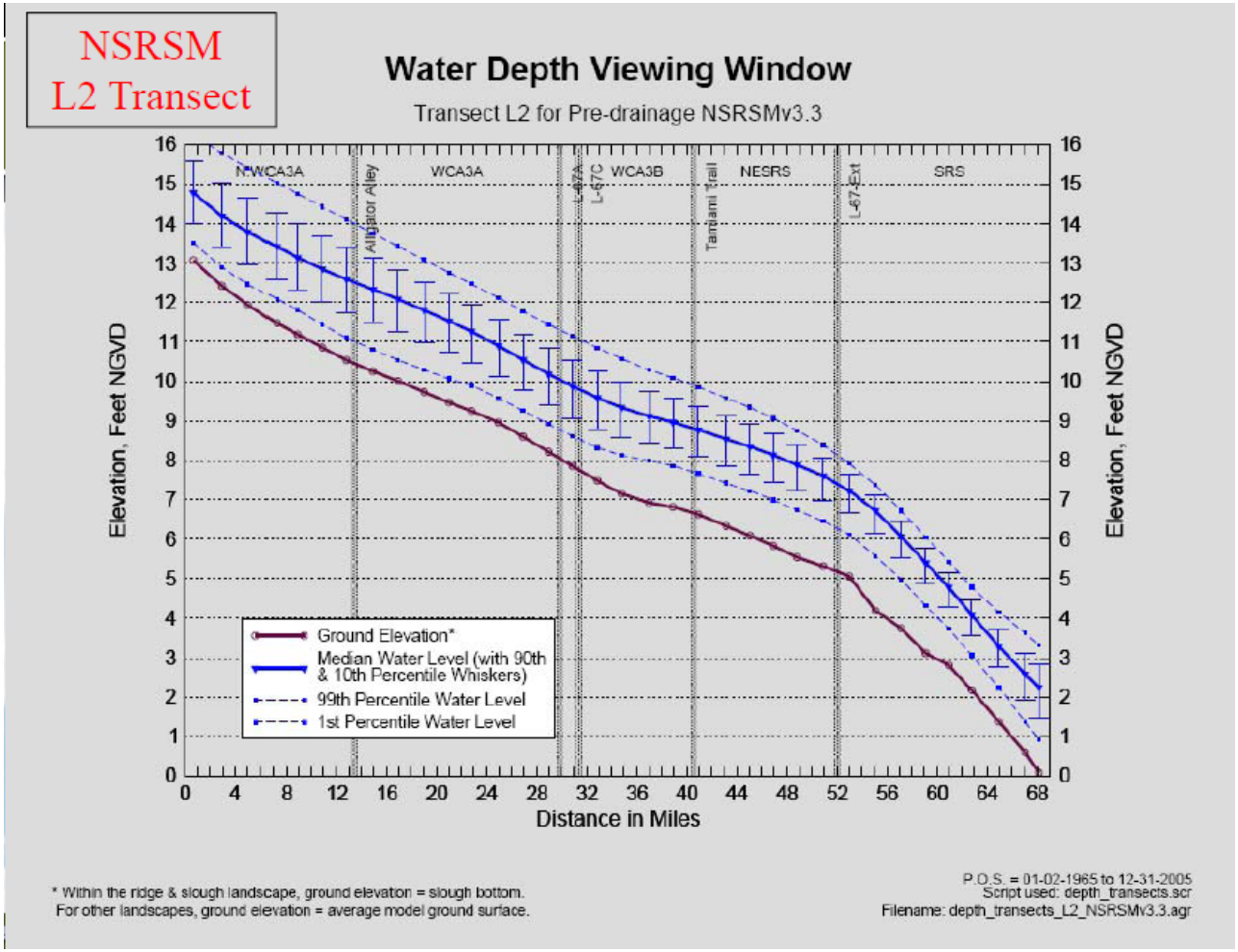
- High volume flow pulses are necessary to sustain/develop ridge-slough-tree island habitats
- Historical average velocities were 1-2 cm/sec, while existing observed velocities in WCA3 are 0-1 cm/sec
- The combination of doubling average velocities and translating high volume rainfall events through the EPA as high volume pulse-flow events is consistent with the stated need of Florida Bay (2-10 times existing volumes of delivery is necessary)

Context of River of Grass Planning



Source: Walter Wilcox and Chris McVoy, River of Grass Planning 1/27/2010

Historical soil and water surface slopes



Source: Walter Wilcox and Chris McVoy, River of Grass Planning 1/27/2010

Fascinating proposals

- Recyclable Water Containment Areas
  - Provides inland water storage and perhaps nutrient removal as a contractual agreement with individual landholders
  - Part of a multiyear crop rotation process
  - Interest has been expressed by the agricultural community
  - A non-structural alternative to reservoirs (and perhaps STAs)

Troubling trends

- Human use of groundwater system has elevated salinity levels and reduced fresh groundwater storage potential
  - Current uses increase risk of systemic failure of freshwater storage system
- As we learn more about unknowns in the regional system, our sense of concern grows and our perception of the likelihood of full restoration is diminished