Water sustainability is an urgent, complex, and trans-disciplinary problem. Complex biophysical and social processes influence water use, quality, and availability. Few research areas have a greater need for modern Cyberinfrastructure tools than water science, yet progress on meeting the grand challenge of water sustainability is hindered.

Software Culture

Too many researchers spend too much time creating functional high-value code that has an unsustainable architecture

- Not supportable, reusable, sustainable, or interoperable
- Science slows down as software maintenance needs go up
- A better understanding is needed of the vast difference between programming, software engineering, and computer science

...SCIENTISTS AND THEIR SOFTWARE

A survey of nearly 2,000 researchers showed how coding has become an important part of the research toolkit, but it also revealed some potential problems:

- 45% said scientists spend more time today developing software than five years ago
- 38% of the scientists spend at least one fifth of their time developing software
- Only 47% of scientists have a good understanding of software testing
- Only 34% of scientists think that formal training in developing software is important

Outcomes

A new Institute model – based on Agile and Open Source principles applied beyond software – that facilitates integration of data, ideas, theories, and/or methods from a variety of sources to address water science issues requiring synthetic knowledge, which has not emerged using traditional disciplinary methods.

- Enabling and accelerating new water science; e.g. WSSI-SESYNC Green Infrastructure Venture project
- Increased productivity and research capability of the water science research community
- Transformed research and software conduct of the water science research community including education and workforce development; e.g. ISEES-WSSI Open Science for Synthesis (OSS) Training Institute for early career scientists and OSS CodeFest ESIP Software Cluster
- Initial and ongoing evaluative framework for assessing impact