Context: WFOS is a first light instrument. The 2016/2017 OMDR phase concluded that the previous concept had insurmountable technical challenges. During the OMDR and WFOS Conceptual Design 1 phases, fiber and reconfigurable (Xchange) spectrograph architectures were developed (2017/2018).

Top: Illustrations of the sampling of the TMT focal plane for the Xchange (far left) and fiber fed forms of the WFOS instrument when sky nodding. 7’ diameter field is for 4 modular spectrographs with 22” pitch, 100% overlap fiber positioners.

Left: Xchange-WFOS instrument design concept (upper) and optical layout (lower) showing articulated camera positions for high spectral resolution modes.

Right: Modular Fiber-WFOS instrument design concept showing the full potential 9 spectrographs and 700 fiber collectors over 10’ field (baseline is 4 spectrographs).

Background subtraction with Fibers
Analysis shows that for observations lasting many hours, requiring sky subtraction precision of 0.1%, negligible fiber systematics are expected when sky-nodding.

<table>
<thead>
<tr>
<th></th>
<th><strong>Xchange-WFOS</strong></th>
<th><strong>Fiber-WFOS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Spectral resolution</td>
<td>Baseline 1500 – 5000, grating dependent</td>
<td>Fixed 3500 to 5000. Binning for lower resolution</td>
</tr>
<tr>
<td>Limiting magnitude</td>
<td>~24.1 g(AB) in 1hr S/N=5</td>
<td>~24.0 g(AB) (Compare to 22.1 for GMOS)</td>
</tr>
<tr>
<td>Wavelength coverage</td>
<td>0.31-1.0μm continuous at R=1500. 40nm in the blue, 140nm in the red</td>
<td>0.31-1.0μm continuous at R=5000</td>
</tr>
</tbody>
</table>

Principal investigator: Kevin Bundy
Project scientist: Chuck Steidel (Caltech)
Project manager: Maureen Savage (UC Observatories)
Cross partnership development team

Downselection process and timeline:
- Technical review 4/5 April, 2018 – Concluded all architectures are technically feasible
- Re-assessment of top level WFOS science requirements by SAC, using community input – 26 July, 2018
- Downselect to single architecture – Early October 2018

https://www.ucolick.org/home/facilities/instruments/wfos.html