



Maunakea Observatories – Frequently Asked Questions

ASTRONOMY ON MAUNAKEA

- **What makes Maunakea so important to astronomy?**
ANSWER: Maunakea's superb natural environment is ideal for astronomy. The height of the mountain, lack of light pollution, dry atmosphere, and minimal air disturbances make Maunakea the foremost place in the world for astronomy research. The world looks to Hawaii for this knowledge that cannot be collected anywhere else.
- **What contributions do the observatories deliver to the community?**
ANSWER: The observatories have an Astronomy Outreach Committee (MKAOC) that coordinates and organizes the outreach efforts of the Maunakea Observatories, and acts as a community forum for the observatories, related organizations and the Maunakea Visitor Information Station (MKVIS). MKAOC spearheads and funds annual events like Astro Day, as well as educational programs that include regular in-classroom educational events for local students. A sample of their community programs and collaborations can be found on the committee's website: <http://www.mkaoc.org/programming>. Each of the Maunakea Observatories conduct educational outreach programs that inspire kids on Hawai'i Island, throughout the state, and around the world.
- **How do the observatories and the science that occurs on Maunakea directly affect people as individuals?**
ANSWER: The observatories impact local people directly in many ways, including educational outreach, community service, and through creation of jobs. Approximately half of observatory employees were hired locally. Additionally, the Maunakea observatories have been able to make great impacts in the astronomy community and beyond both locally and globally. In 2000, some of the Maunakea telescopes worked with Internet2, a non-profit community of U.S. and international leaders in research, academia, industry and government who create and collaborate to make the world a better place via innovative technologies. The Internet2 collaboration allowed some Hawai'i schools as well as astronomers worldwide the opportunity to utilize some of the Big Island telescopes for research and education through this initiative.

The observatories have also made amazing discoveries that have advanced our civilization. For example, technological developments for the observatories have led to lens technology used in eyeglasses today, as well as the GPS features in cell phones.

- **Do the observatories have a process/consultants in regards staff and visitors respecting/observing Hawaiian traditions/culture, as well as education on cultural and environmental awareness?**
ANSWER: All observatory personnel receive training in the cultural significance of Maunakea. The observatories are very respectful of the Hawaiian culture, following specific protocols on the mountain guided by Kahu Ku Manu council and others.

Also, the Office of Maunakea Management has been providing training sessions for the observatories' staff as well as the vendors who go up and work at the summit for years to ensure that all people working on the mountain are respectful of both the environment and culture. Cultural practitioners are consulted regarding awareness and reverence for the mountain. Maunakea Visitor Information websites provide links on the legends surrounding Maunakea, to educate locals and visitors alike. (<http://www.ifa.hawaii.edu/info/vis/culture/the-white-mountain.html>).

ENVIRONMENT

- **What effects do the observatories have on the aquifer/water that is sourced from Maunakea?**

ANSWER: Comprehensive research by expert hydrologists confirms that TMT and the existing 13 observatories pose no danger to the aquifer. There is very little precipitation above 8,000 feet and the observatories are located well above that at the top of Maunakea at about 14,000 feet. The watershed recharge areas for Maunakea occur at lower elevations, where it rains.

According to a 2010 Environmental Impact Study (EIS), "in the case of the (TMT) Observatory... (proposed) measures would result in all precipitation (to) ultimately recharge underlying aquifers because runoff would be directed to nearby areas where it would percolate into the ground rather than enter streams that discharge to the ocean. Therefore, the potential impact associated with impervious surfaces will be less than significant."

Source: Final Environmental Impact Statement composed by UH Hilo:

http://www.malamamaunakea.org/uploads/management/plans/TMT_FEIS_vol1.pdf, page 208

- **Is it true that the observatories store hazardous materials on Maunakea?**

ANSWER: Certain chemicals are indeed necessary for maintaining the observatories, however, the observatories' highly-trained staff comply with strict Federal and State safety guidelines to ensure that all chemicals are contained on site, used/handled and properly disposed of in compliance with DOT, OSHA/HIOSH, and EPA.

- **Wekiu bugs, silversword and other native species – what is the impact and the mitigation?**

ANSWER: No significant impacts have been identified on native species, regarding TMT construction. For more information, please consult the final EIS at http://www.malamamaunakea.org/uploads/management/plans/TMT_FEIS_vol1.pdf.

OBSERVATORIES

- **Is it true that the observatories don't pay rent?**

ANSWER: While there is a \$1 rent that is often referred to and gives the impression that the observatories do not pay rent, the real investment comes in the form of telescope time each observatory provides to the University of Hawai'i (UH) for the use of the land. For Keck Observatory alone, that contribution equates to more than \$3 million per year. The observatories' relationship with the UH is a scientific collaboration in which UH manages the site and leases land to several multi-national facilities which have invested more than two billion dollars in science and technology studies.

- Is it true that most of the observatories on the mountain don't work?**
ANSWER: No. 12 of the 13 observatories on Maunakea are all fully functioning and have features and focuses that differ from one another, all contributing to astronomical research that impacts the environment and the living populations on earth.
- If there are already thirteen observatories on the mountain, why do we need another one?**
ANSWER: Each observatory on Maunakea has a different specialty. The technology provided by the TMT would provide scientists with a powerful new tool. TMT represents a big jump in the light collecting power. It will be the largest optical/IR observatory in the Northern Hemisphere by almost a factor of 10 in light-gathering power. As the world's most advanced and capable observatory, the TMT could allow scientists to investigate the possibility of extraterrestrial life, planets inhabitable for humans, and asteroids. The implications of this research, such as a better understanding of Earth's environment and resources, are long-standing and potentially life-saving.
- What is the estimated size of TMT, and why will it be so big?**
TMT's mirror be three times as wide, with nine times more area, than the largest existing visible-light telescope in the world, but will be only 43 feet taller than the existing Subaru Observatory and have a footprint comparable to the existing W. M. Keck Observatory. This telescope will deliver sharper and deeper images than existing telescopes both on the ground and in space. Sharper images allow us to see smaller objects and more detail; thus TMT will provide three times better resolution and detail than other telescopes. TMT will also deliver a huge increase in sensitivity or image depth, thanks both to the larger area of the telescope and the sharper images. Increased sensitivity will finally allow astronomers to detect the faintest, most distant galaxies and the smallest stars and planets. High sensitivity also means the properties of stars and galaxies are measured more quickly, allowing more objects to be studied and more rare objects to be found. The TMT will be a general-purpose telescope, able to carry out different scientific investigations across many areas of astronomy, planetary science, and physics. (source: www.maunakeaandtmt.org)
- What did the Thirty Meter Telescope's seven-year approval process entail?**
For over seven years, all those involved with the TMT construction worked tirelessly to ensure that the structure was in compliance with local regulations and mandatory reviews. Seven public scoping meetings and seven draft EIS meetings were also held to discuss the construction. According to the Conservation District Use Permit (CDUP), the telescope met all eight criteria established, including being consistent with state laws governing districts, not causing substantial adverse impact to existing natural resources, being compatible with the surrounding area, preserving the existing physical and environmental aspects, not subdividing or increasing the intensity of land use and not being materially detrimental to public health, safety and welfare. As a result, all required state and county permits were issued to the TMT. This compliance was upheld in a lower court and is currently being reviewed by the Hawaii Supreme Court. Native

Hawaiian cultural practices and resources were assessed as having been properly and adequately considered.

Read the full Comprehensive Management Plan on the Office of Mauna Kea Management's (OMKM) page here:

<http://www.malamamaunakea.org/management/comprehensive-management-plan/>