

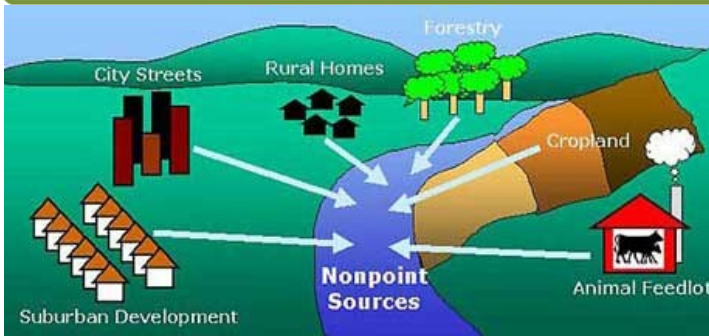


Environmental Protection Department

Our Mission is to protect, monitor, restore, and regulate Morongo's natural resources, honoring and protecting all life, land, and traditions and enhancing tribal sovereignty. We will promote environmental awareness and environmentally considerate actions by exemplifying environmental stewards, fostering collaborative relationships, expanding education and outreach activities, and continuing to enrich and develop our programs.

Residential Nonpoint Source Pollution & IPM

Written by: Micah Knox, Environmental Specialist I



Example of nonpoint source pollution. Multiple diffuse sources of pollution creating runoff into a single waterway.

Nonpoint source pollution poses a significant challenge for our reservation, as well as numerous other natural habitats. This form of diffuse pollution primarily stems from factors such as land runoff, precipitation, atmospheric deposition, drainage, seepage, and hydrologic modifications. To illustrate this concept, refer to the image on the left, which

provides an example of how nonpoint source pollution operates. In essence, various sources of pollution contribute to a watershed without a distinct single origin, resulting in landscape degradation without a clear entity to blame.

Although it might seem distant from the concerns of an average person, consider the possibility that you might be part of the issue. Have you ever used fertilizers or any type of insecticide, herbicide, or pesticide as your initial approach to managing unwanted plants and animals? The improper use of these toxic chemicals and growth promoters can lead to significant adverse downstream effects on the toxicology and pharmacokinetics of an ecosystem. Introducing a seemingly inconsequential volume of poison into a stream can lead to the death of microorganisms and other life forms residing there. Conversely, the introduction of nitrogen and phosphorous from fertilizers can trigger harmful algal blooms, outcompeting and suffocating native organisms within the ecosystem, thus disrupting the local food web.

So, what actions can we take to mitigate nonpoint source pollution at the local level? Education about integrated pest management (IPM) is essential for maintaining proper ecosystem functioning. This involves prioritizing safer alternatives to conventional toxins that must be explored before resorting to the use of -icides as a last resort. Alternative approaches to chemical control encompass physical and mechanical strategies, biological solutions, and shifts in cultural practices.

Biological methods involve introducing natural predators to manage pests and mitigate their impact effectively. Employing physical and mechanical techniques, such as using traps and barriers to remove and deter pests, offers a viable alternative. Lastly, cultural changes, like adjusting irrigation practices to prevent excessive water use that can lead to root diseases and weed growth, play a crucial role in reducing pest-related problems.



Common Aphids—a common garden pest

References: US Environmental Protection Agency—Polluted Runoff: Nonpoint Source Pollution <https://www.epa.gov/nps>; University of California Agriculture & Natural Resources—What is Integrated Pest Management <https://ipm.ucanr.edu/what-is-ipm/>

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Cleaning Up Morongo's Recycle Bins

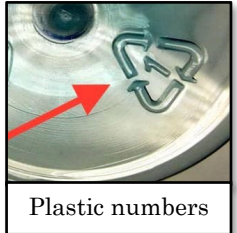
Written by: Jessica Southard, Environmental Specialist I

Figuring out what goes in the blue curbside recycle bins can be confusing! There are many reasons for this, including the labeling on containers, what the recycle facility will accept, and what materials the end user will accept. Because of this, the items accepted from city to city can be different, which adds to the confusion. Where a person lives and works can have different rules.

Here at Morongo, residential curbside bins have a sticker on the lid (see the image below), to help clarify what we can accept in our bins. These list the most common Dos and Don'ts of recycling.

DO RECYCLE: Metal (like tin and aluminum cans), Glass, Plastic #1-#4 (look for the number on the plastic container), Cardboard & Paperboard, and Mixed Paper.

DO NOT RECYCLE: Any Food or Liquid (this includes recycles with food or liquid in/on them), Items with plastic/waxy liners (like frozen food boxes, coffee cups, & paper plates), Paper Towels/ Napkins, & Tissue, Items smaller than your hand, **PLASTIC BAGS** (like trash bags, shopping bags, Ziploc bags, and flimsy plastic film. This also means don't bag your recyclables), and Mixed material items (like paper envelopes with plastic windows, or paper bags with plastic handles).



Recycle bins with contamination don't just hurt the recycling process, they also lead to higher waste disposal bills for the Tribe. The Environmental Protection Department, Pollution Prevention Program will be conducting periodic curbside recycle bin assessments to help residents determine if they are using their recycle bins appropriately. If we find contamination, we'll leave you a courtesy note outlining the items we found that are not allowed in the blue bin. If you'd like to ask about specific items, please email us at p2@morongo-nsn.gov. If your waste does not go into Morongo's waste stream, contact your local waste hauler to find out what items they do and do not accept.



RECYCLE			NO
 Tin Cans (Clean & Dry)	 Plastic: Bottles, Jugs, & Containers (Empty)	 Aluminum Cans (Empty)	 Food or Liquid
 Glass: Bottles & Jars (Without Lids)	 Cardboard (No Food Stains)	 Paperboard (No Food Stains)	 Frozen Food Boxes
 Mixed Paper: Brochures, Magazines, Newspaper, Office Paper, Junk Mail, & Catalogs (No Envelopes)			 Paper Plates, Napkins, Cups, or Plastic Cutlery
			 Don't Bag Items

Map It With GIS

Written by: Jonathan Rodriguez, GIS Specialist



Mapping has been a part of our society for thousands of years, and although our penmanship and art style has improved throughout those years, only in the recent 50 years has mapping accelerated to completely new heights contributed from Geographic Information System. Most are familiar with basic reference maps from atlases or literature sources, but anyone with a smartphone has become quite dependent on web mapping platforms like google maps to find places of interest. These web mapping platforms are able to function thanks to GIS. Geographic Information System (GIS) is a very broad and holistic profession embedded into various industries to be used as a tool and a science. GIS is the study of Earth's features that are digitized into a point, line, or polygon, which can also include other data that can be

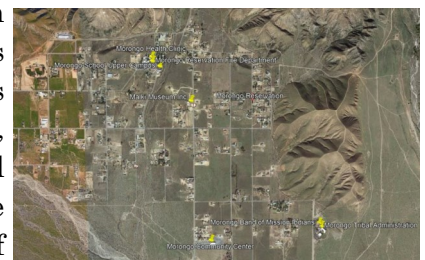
analyzed for industries that can be stored in a spatial database, allowing easier access to project members. GIS traditionally consists of capturing raw data on the field using a positioning system that capture GPS points, this data is then transfer to a GIS mapping software program where one can edit or add associated data to the features. Cartography then takes over, this data can then be symbolized and categorized, this creates an output of a detailed map, dataset layer or webapp to create better improved spatial analysis of the area in focus.

How Does Morongo use GIS

The Morongo Band of Mission Indians uses GIS as a tool to find a source of information to capture data from the field or an already established dataset from various sources, such as the Bureau of Indian Affairs (BIA). With this data, Morongo GIS has created interactive web apps that contain geospatial information for the departments of Realty, Environmental, Tribal Historic Preservation Offices (THPO), Survey, Construction, Emergency Services and more. An example of this process can be applied working with the Environmental Department, Morongo GIS uses Global Navigation Satellite System (GNSS System) to capture a feature which pinpoints the location, such as a burrowing owl nest. This data is then transferred to our ArcGIS Pro software where we use a GIS tool to create a 200 foot radius buffer that informs other departments to not disturb the owls' nests. THPO also gets assistance in a similar way by pinpointing artifacts found during pedestrian surveys. In the Realty department, the GIS Specialist creates detailed maps for a variety of reality projects. One example is adjusting or creating new boundaries of allotments based on pinpointed data by surveyors.



A large portion of this data is stored on a server, where each department has access to their own data or web apps. This setup allows the departments to utilize this data to help create future decisions. GIS is constantly changing as newer technology such as software and devices, continue to develop leading towards the improvement of the accuracy and interfaces of GIS processes. Rest assured that Morongo GIS will have the never-ending task of staying up to date with these latest improvements of GIS.



References: Image Source: <https://pixabay.com/photos/network-digital-technology-earth-8192962/>

Image Source: <https://pixabay.com/photos/smartphone-orientation-map-travels-6131852/>

Image Source: <https://morongonation.org/realty/>

Save Water with a Native Plant Garden

Written by: Kimberly Miller, Environmental Specialist II

While September 23 was the first day of fall, it doesn't always feel that way in Southern California until October or even November. The changing season is a great time to think about transitioning your garden (or even just part of it) to native plants rather than exotic plants or grass lawns. The potential for rain and lower temperatures allow native plants to take advantage of good conditions and adapt to their location before the heat of summer. Native plants have many benefits including providing food and habitat for insects and wildlife, requiring less fertilizer and maintenance, having no threat of becoming invasive if accidentally spread to the wild, and needing much less water to thrive than typical nursery plants or lawns. Water conservation is an important benefit to focus on in our semi-arid climate where the next drought is always potentially right around the corner.



Outdoor water use makes up around half of all urban water use. A well designed, drought-tolerant native garden can use 85% less water per year than a traditional landscape with turf and high-water use plants. This means that if you use 83 gallons of water outdoors (the average in our area for the month of July), you could reduce that by about 70 gallons to only using 13. Native plants are already adapted to the local temperature and precipitation patterns. In California, this means most species are already able to survive heat waves and periods without rain. Many traditional landscape plants come from places far from California with different climate patterns. For example, Kentucky bluegrass is one of the most popular lawn species in the United States. It is native to Europe and some parts of northern Asia and Africa. While it grows well most of the year in the northern part of the country, it has a hard time growing in California's hot summer season. This leads to a lot more water use to keep it looking good. There are many warm season grasses native to California that are a better ornamental grass or groundcover replacement.

Once you have a native garden in place, how you irrigate can help save water as well. Once plants are established, only a few deep soakings are needed during dry spells. Additional watering may not be needed during the late fall through early spring. Most native plants from our area have well developed root systems that are used to searching our water and can efficiently use the sporadic precipitation it gets. Even if all of your plants are native, you should still check your irrigation system for leaks, make sure you are only watering where you want to, water when there is less evaporation in the early morning, and remember to wait on watering if we get significant rains.



There are many resources to help you plant native plants and reduce water. Check out Bloom! California—<https://bloomcalifornia.org/>, CA Dept. of Water Resources Water Efficient Landscaping—<https://water.ca.gov/water-basics/conservation-tips/plant-and-landscape-guide>, UC Center for Landscape & Urban Horticulture—https://ucanr.edu/sites/UrbanHort/Water_Use_of_Turfgrass_and_Landscape_Plant_Materials/, Water Saving Garden Friendly for the Inland Empire—<https://www.ie.watersavingplants.com/>, Tree of Life Nursery—<https://californianativeplants.com/education/beginner-blogs/>, or CA Native plant society—<https://www.cnps.org/gardening>.

TRIBAL WATER PROGRAM

Lampshades as Indoor Air Purifiers

Written by: Lina Luu, Environmental Specialist I



Common sources of VOCs. Figure obtained from AirMasters.
<https://www.airmasters.ca/2018/04/01/volatile-organic-compounds/>

Volatile organic compounds, or VOCs, are compounds that include a variety of chemicals, many of which are human-made. VOCs can be found in many common indoor products (as seen on the figure to the left). Typically, VOCs are seen in industrial solvents, fuel oxygenates, or byproducts that are produced by chlorination during the process of water treatment. “Petroleum fuels, hydraulic fluids, paint thinners, and dry cleaning agents” often contain VOCs as well (EPA). VOCs can be emitted as gases from certain solids or liquids including: “paints and lacquers, paint strippers, cleaning supplies, pesticides, building materials and furnishings, office equipment such as copiers and printers, correction fluids and carbonless copy

paper, graphics and craft materials including glues and adhesives, permanent markers, and photographic solutions” (EPA). These emissions can be released while they are in use, and, to some degree, when they are stored. Concentrations of many VOCs can be up to ten times higher indoors compared to outdoors. This is important to note since people spend a large majority (more than 90%) of their time indoors. It is important to be aware of the risks VOCs have on short- and long-term health.



The removal of VOCs from indoor air typically relies on using activated carbon or different types of filters. Other methods include the use of thermocatalysts (which are activated by heat) and photocatalysts (which react to light). Recently, scientists have created a catalyst-coated lampshade that targets VOCs and can transform the way indoor furniture is used. “Halogen bulbs convert a mere 10% of the power they use into light, with the other 90% being transformed into heat... Incandescent bulbs are even worse, emitting 5% light and 95% heat” (ScienceDaily). In order to utilize the heat that is already present, researchers placed an aluminum lampshade with an inner coat of thermocatalysts (made of titanium dioxide and a small amount of platinum) over a 100-watt halogen bulb to decompose VOCs. During this time, the lampshade was able to reach temperatures up to 250 degrees Fahrenheit and activate the thermocatalysts and convert VOCs into acetic acid, then formic acid, and finally into carbon dioxide and water. The researchers are continuing to test out less expensive alternatives for platinum and other ways to expand the lampshade concept to use LEDs.

References: EPA—What are volatile organic compounds (VOCs)? <https://www.epa.gov/indoor-air-quality-iaq/what-are-volatile-organic-compounds-vocs>;

Science Daily—Clever coating turns lampshades into indoor air purifiers <https://www.sciencedaily.com/releases/2023/08/230816114205.htm>

TRIBAL AIR PROGRAM

Emissions Inventory on Morongo Reservation

Written by: Pamela Atcitty, Environmental Specialist II

What is an Emissions Inventory?

An emissions inventory (EI) is a detailed report of air pollutant emissions associated with different emitting sources that are discharged into the atmosphere. This report usually contains the total emissions for one or more specific greenhouse gas or air pollutants originating from all source categories in a certain geographical area and within a specific year. Morongo Tribal Air Program (TAP) completed its third emissions inventory report earlier this year, using the most recent 2017 National Emission Inventory (NEI) data. Morongo TAP was able to update existing emission source categories, as well as inventory new sources. This EI Report compared past emissions inventories to show changes over time and explains differences in the emission sources. Emission sources that were inventoried were stationary point and nonpoint (or area) sources, as well as mobile onroad and offroad sources. An example of a point source can be emissions release from Morongo's Cogeneration facility, whereas a nonpoint area source are numerous small activities that cannot be individually tracked, such as forest fires or a gasoline station. Mobile sources are categorized as on road or offroad. On road mobile sources include vehicles and trucks, while offroad sources include construction equipment, motorboats or lawn equipment.

What was discovered in the Emissions Inventory?

The five pollutants inventoried from the above mentioned emission sources were volatile organic compounds (VOC), nitrogen oxides (NOx), carbon monoxide (CO), particulate matter (PM), and biogenics. Figures 1 -4 graph the VOC, PM10, CO, PM10, and VOC emissions for all sources on the Morongo Reservation, and inventoried in the 2017 EI, in comparison to the previous 2008 and 2014 EIs.

Increased Emissions- Figures 1-3 display considerably large changes in VOC, CO, and PM10 emissions from 2008 to 2017, which is primarily due to the added inventory of wildfires, industry, and commercial sources for the 2017 EI in the nonpoint (area) source category, which were not reported in any previous EIs. VOCs total emissions increased drastically by 148% from 197 tons to 1350 tons. NOx total emissions increased by 62% or by 555 tons, and total PM10 emissions increased from 66.3 ton to 478.6 tons, a 151% difference.

Decreased Emissions- Emissions from all four pollutants for point and onroad mobile sources have been decreasing since the first 2008 EI report, most likely in response to improved calculation methodology used by both EPA and California Air Resources Board (CARB) emissions inventory databases, as well as activity figures gathered from these sources. VOC from Morongo point emissions decreased by 3.26 tons per year, a 51.7% difference. NOx point source emissions decreased by 7.5%. PM onroad emissions decreased from 85%, while CO point source emissions decreased by 125%. *Email patcitty@morongo-nsn.gov for a copy of Morongo's 2017 EI report.*

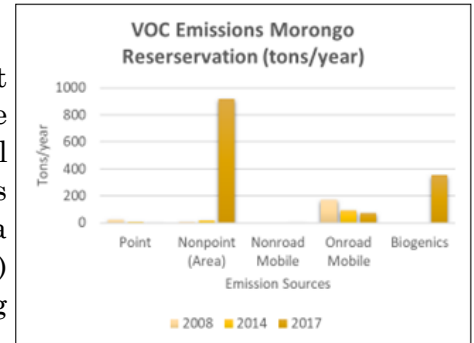


Figure 1. VOC Emissions

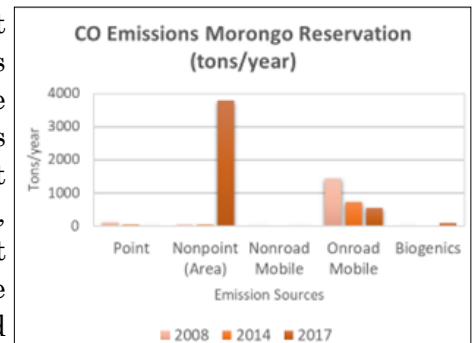


Figure 2 . CO Emissions

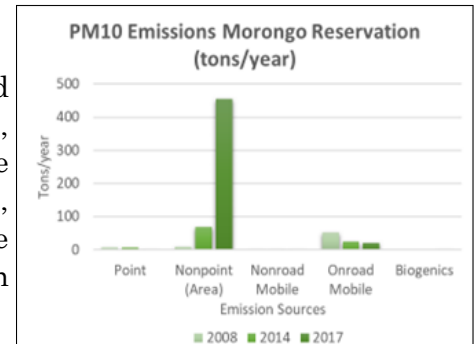


Figure 3. PM10 Emissions

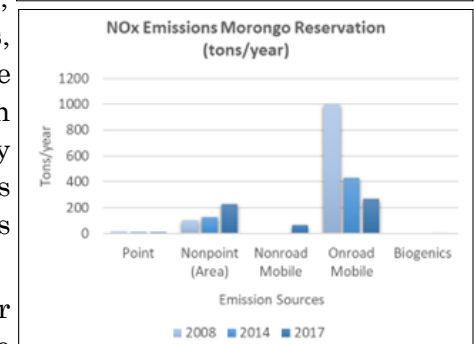


Figure 4. NOx Emissions



Morongo Air Quality Monitoring Project Update

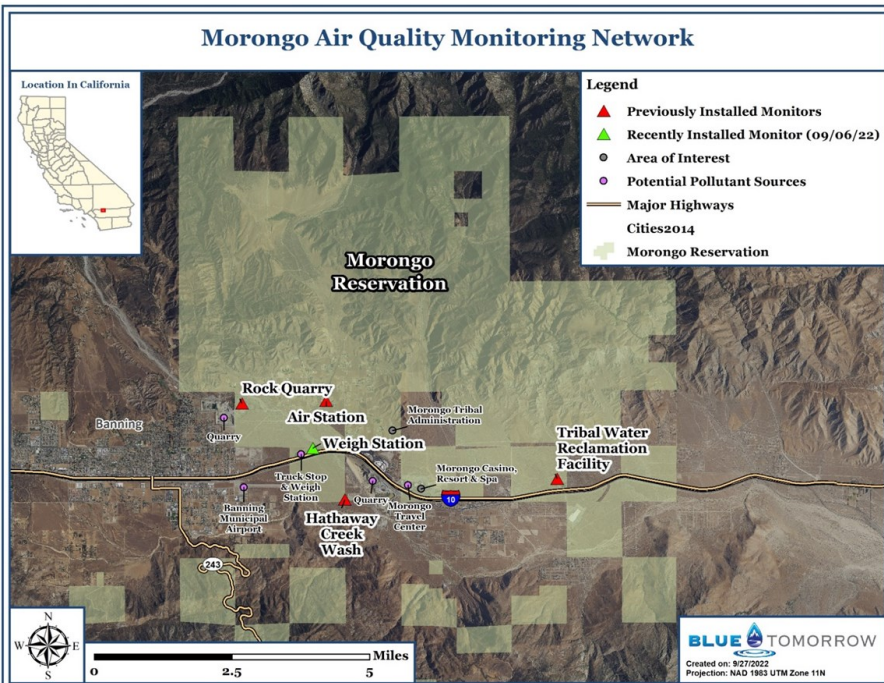
Written by: Isabel Hughes, Environmental Administrative Assistant

In Fall of 2020, the Tribal Air Program, in collaboration with Blue Tomorrow LLC, started the Morongo Community Air Quality Monitoring Project which developed an air monitoring network consisting of five low-cost community air quality monitors across Morongo Reservation. The project is funded by the California Air Resources Board through the Assembly Bill 617 (AB 617) Community Air Monitoring Grant Program.

The purpose of the project is to collect air pollutant concentration data across the Reservation and examine the data from Community Monitors, noting trends and notifying the community when Air Quality Index (AQI) levels are significant. The data includes outdoor levels of ozone (O₃), nitrogen dioxide (NO₂), two different sizes of particulate matter (PM_{2.5} and PM₁₀), and volatile organic compounds (VOCs). The project tracks air pollution data across the Reservation in real-time, which members of the Morongo community can view at MorongoAir.com.

The project has completed a full years worth of data starting from 2021, allowing the Tribal Air Program to note trends throughout the months and compare prior data to current data received from the Community Monitors and compare to the data received from the Morongo Air Monitoring Station (AMS).

From comparison of the completed year to recent data, the project has shown that on the Reservation, the Air Quality Index levels average higher by the Morongo AMS. The data spikes in the summer months, where many of the pollutants are affected due to hotter temperatures. Likewise, the pollutants are lower in the winter months due to colder temperatures. The locations of the Community Monitors give insight into how the air is impacted due to certain disturbances, like cars, ATVs and wind influence. The data determined that ozone is the most prominent pollutant on the reservation, followed by PM_{2.5}. Nitrogen dioxide and PM₁₀ were at a lower concentration throughout the monitoring period which was not a significant risk than other pollutants. VOC spikes were most frequent at the Morongo AMS.



Morongo Air Quality Monitoring Project is part of California Climate Investments, a statewide program that puts billions of Cap-and-Trade dollars to work reducing greenhouse gas emissions, strengthening the economy, and improving public health and the environment — particularly in disadvantaged communities.



TRIBAL AIR PROGRAM

Upcoming Events

September-October Vehicle Removal Months!

Vehicle Removal & Recycling

Email
p2@morongo-
nsn.gov or call
951-755-5128 to
schedule the
safe & secure
removal of your
vehicle.



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