

Thredbo village environment walk

Please allow around 2 to 3 hours to complete this walk. This walk is suitable for people with a low/medium level of fitness, and is fairly flat throughout. The approximate length of this walk is 6 km.

This informative walk will take you through the village and surrounds, starting at the golf course and following the Thredbo River along the 'Pipeline Path' then down to the Environmental Services work areas including the Sewage Treatment Plant and Waste Transfer Station. If you are still feeling energetic after all that, a quick detour on the way back to town will take you up to the main Thredbo water supply and further afield if you're up for it.

Kosciuszko Thredbo Pty Ltd, the company that has the head lease over Thredbo, manages all urban and mountain infrastructure. On this walk you will be shown how the various forms of infrastructure around the village perform their essential functions and prevent undue impact upon the natural environment in Thredbo.

Keep note of the state of the Thredbo River throughout the walk, and keep an eye out for some of the native wildlife.

The care taken by Kosciuszko Thredbo Pty Ltd to protect the environment has allowed the village to become benchmarked by EarthCheck. This showcases the efforts made by the resort to ensure Thredbo is an environmentally, economically and socially sustainable tourism destination." To find out more visit www.thredbo.com.au/village-life/environment/

1 Begin your walk at the Thredbo Memorial Community Centre located at the base of Crackenback Drive. Start from the Golf Course first tee.

Thredbo operates a 9-hole golf course outside the winter months. Due to the close proximity of the course to the Thredbo River and the fact that it operates within the Kosciuszko National Park, special attention is paid to the type of materials used on the course to keep it in good condition. The golf course design incorporates vegetated buffer zones adjacent to streams, and drainage lines for the purpose of sediment capture. The greenkeeper has a duty of care to ensure the minimal use of fertiliser and herbicides on the course. Inspect the river running here – no urbanised development exists upstream from Thredbo Village so the river runs past here in its near-natural state.

Below - Wetland filter at Riverside Car Park, filtering stormwater run-off from urban areas



2 Cross the Thredbo River via the bridge and head along Thyne Reid Drive to the small duck ponds located adjacent to the Thredbo Alpine Hotel.

These duck ponds and the ones that you have already passed form part of a network for treating stormwater runoff from both built up and natural areas. The duck ponds are actually sedimentation basins and perform the function of removing fine sand, silt, and litter from stormwater flows before the water is discharged into the Thredbo River. Around every five years the duck ponds are drained and silt that has been captured over the previous years is removed.

3 If you walk around the corner toward the Village Square, you will see the location of a Gross Pollutant Trap (GPT) servicing the duck ponds, it is located just next to the car park for Boali Lodge. Most of the water that flows down the numerous branches of stormwater lines in the village passes through professionally manufactured GPT's, which are pollutant trapping mechanisms ranging from simple 'trash racks' (metal grilles) to the Continuous Deflective Separation (CDS) units. The CDS units act on centripetal forces to catch litter including hydrocarbons (oil based fuels), with a minimum 90% capture rate for solids over 1mm. They can process flows of up to 53 litres per second. These traps require annual cleaning and maintenance.

Walk back down to the river to the flow dissipater located on the edge of the riverbank opposite the Thredbo Alpine Hotel carpark.

4 Along the banks of the Thredbo River (within the village) you will notice several 'flow dissipaters'. These structures perform a number of functions including -

- collection of larger litter items in the fitted trash racks
- avoiding excessive erosion at that point due to high velocity/energy flows

Thredbo Environmental Services workers periodically walk the length of the riverbank and collect any litter items they come across along the way. This ensures any litter that has escaped the traps will not enter the river.

Walk north along the footpath following the riverbank, stopping opposite the Thredbo Alpine Apartments.

5 Notice along the opposite side of the riverbank, that there are a large variety of native tree and shrub colonies. Some of the species here include Woolly and Swampy tea trees, Grevillea and Cassinina shrubs, Black Sallee and Snowgum trees.

This strip of native vegetation is known as the 'riparian zone' and it performs several functions including bank stabilisation, sediment /litter trapping and provision of habitat to animals. An ongoing planting program will ensure growth of these native vegetation communities.

Located at various points along the riverbank are stormwater-pipe outfalls that are serviced by 'trash racks'. These provide further treatment of stormwater flows by capturing any large litter items that would otherwise end up in the river. Thredbo Environmental Services staff routinely clears these traps.

Thredbo "Duck Ponds" stormwater detention basins



6 When you near the service station, note the six co-joined square lids embedded in the road opposite the intersection of where Mowamba Place meets Friday Drive. This is another GPT – a CDS unit, and serves one of the village stormwater lines, accepting flows from above the Alpine Way and the central village area. Look down toward the riverbank and you will see another style of energy dissipater connected to this line.

7 Continue along the riverbank footpath, past the Fire Station. From this point, cross Friday Drive and start the Pipeline Path walk.

On entering the Pipeline Path look below the bridge. Culverts are pipes that commonly run under roads to allow water to flow freely underneath. Culverts are sized to allow unimpeded flow, but also in Thredbo to allow the upstream migration of fish in the Thredbo River.

For most of the village, sewage flows by gravity with only a handful of low points requiring pumping stations, from which sewage is pumped up to a point where it can flow by gravity.

8 The 'dome' style sewer manhole lid on your left as you start the walk receives flows from Crackenback Ridge, the central village, Woodridge and Friday Flat. From this point, the sewage flows the entire length of the pipeline path in a single 300mm pipe, all driven by gravity. This sewer line feeds directly into the first stage of the Thredbo Sewage Treatment Plant. The pipe is inspected weekly during winter via manholes, to ensure that problems are prevented. Other measures such as Closed Circuit TV camera inspections have also been undertaken to ensure the line is free of problems.

9 As you walk along the Pipeline Path, note the numerous stormwater flumes running down the hill from the Alpine Way.

These flumes have been installed by the National Parks & Wildlife Service (NPWS) to transport stormwater from the drains above the Alpine Way down to the Thredbo River. Notice that some of these flumes terminate in 'gabion energy dissipaters', from which the sediment settles and the clear water spills over and trickles through wetlands areas into the river. These sediment trapping basins require periodic cleaning to remove the settled sands/silts, otherwise they overflow and sediment will be discharged into the river.

10 About half way along the Pipeline Path, look across the river to the left...

... and you will notice the day carparking facilities (located to the right of the snowmaking pumphouse). Impermeable surfaces uphill of this point drain

down through the stormwater infrastructure to another GPT which screens out solids and other contaminants from the carpark surfaces.

During the construction of Overnight No. 3 carpark a number of vegetated swales were placed along the riverside of the carpark, and are used with the Bio-retention drains. This treatment system is similar to that of a sand filter. Bio-retention trenches are a stormwater Best Management Practice developed to utilise soils and both woody and herbaceous plants to remove pollutants from stormwater runoff.

From the GPT, runoff is directed to the 'wetland'/boggy area below the carpark, which again acts as a riparian filter strip. Also note some of the village maintenance vehicles such as the street sweeper/road broom parked in the coach carpark. These vehicles are used as part of a proactive effort to reduce the amount of litter/sediment the GPT's have to treat, thereby increasing their overall treatment efficiency.

On the boggy area down by the river, you will notice locations where willow trees have been removed and their bases remain. The Snowy Mountains Authority planted these during the construction of the Alpine Way in the 1960s for purposes of bank stabilisation. In recent years a collaborative effort between the NPWS and resort operators has focused on removing as many willows as possible, with a view to total elimination of them within Kosciuszko National Park. This is because the root systems actually have a destabilising effect.

11 Just before you reach the end of the Pipeline Path, you will be directed down to the left and around the edge of the snowmaking ponds by the trail markers. As you emerge from the Pipeline Path you will cross the Thredbo River and then (carefully) cross the road. Follow the guardrail along the side of the road and when it ends, look to the right for a sign directing you to the 'Bridle Path'

12 Walk along the Bridle Path until you reach the junction where it splits in two, look to your right over the Thredbo River and you will see a large grey Colourbond building with a sloping roof - the Thredbo Waste Transfer Station. After garbage and recyclable materials are collected from around the village, it is brought down to the transfer station for processing. Non-recyclable waste is fed into a baling machine (inside the large shed) which compresses the waste into containers that are then transported to a landfill facility outside of the Park.

Recyclable material is collected in bags and transported to a converted shipping container (just opposite the transfer station – on the now redundant Thredbo tip site). Here, Environmental Services workers carefully unload the contents of the bags into the container and once full, the container is taken away to a recovery facility outside of the Park.

The large blue machine and grey container you see in front of the waste transfer station is Thredbo's recycled paper and cardboard compactor. The system allows paper and cardboard to be efficiently transported for recycling. This initiative helps reduce the volume of waste Thredbo sends to landfill.

13 If you look to the left of the Thredbo Waste Transfer Station, you will see two white gas tanks. In front of the tanks is a concrete wash down bay constructed so that all of Thredbo's vehicles can be washed and water that potentially contains contaminants and detergents is not allowed to run off into the adjacent creeks. The run-off water is captured and treated before draining back into the Thredbo River, helping to maintain the high quality of the water in the adjacent waterways.

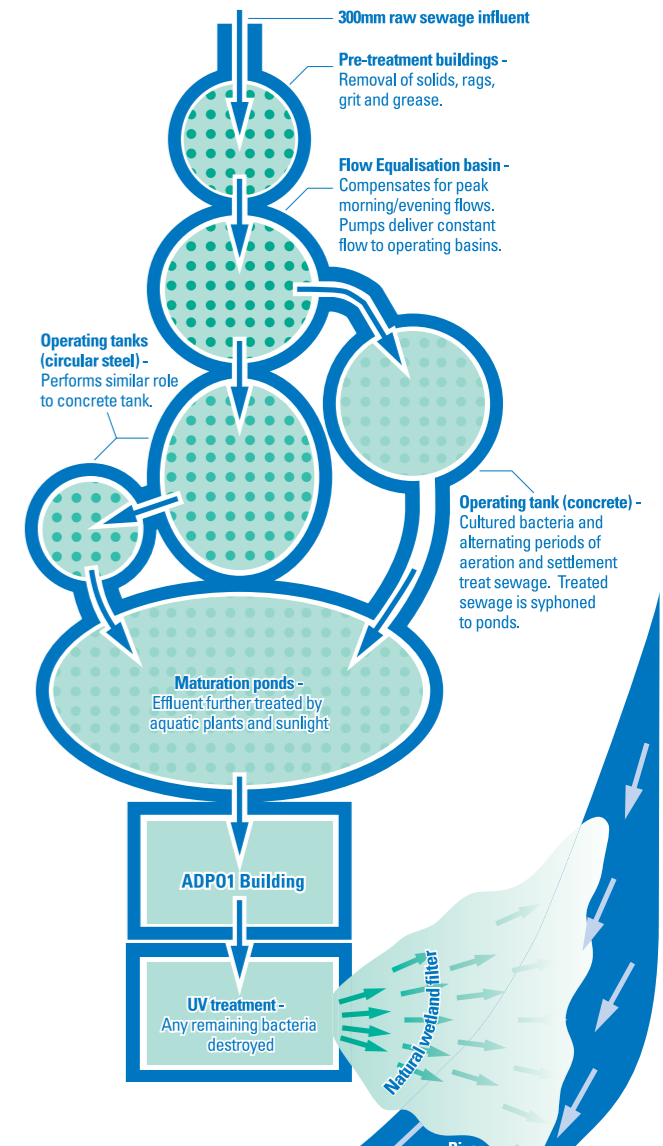
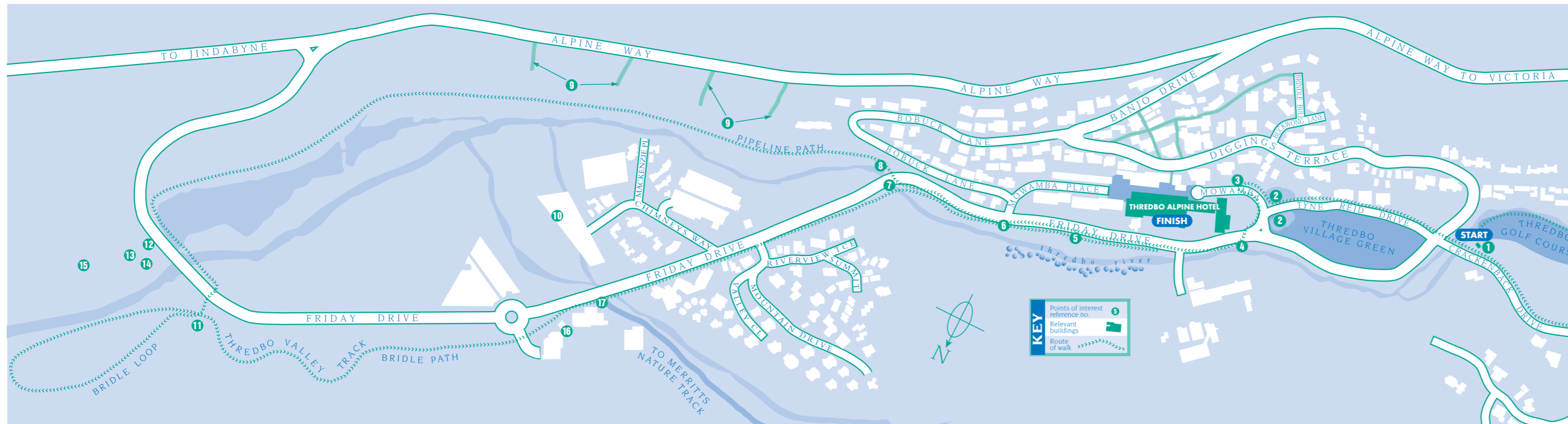


Figure 1a - Diagram of the Thredbo Sewage Treatment Plant's stages

14 The former Thredbo landfill site is located on the elevated area in front of the Thredbo Waste Transfer Station. In use until the early 1990s, rubbish was typically dumped and burnt off on a periodic basis. Since the dawning of environmental awareness, these operations have ceased and the Thredbo tip is no more. Environmental Services now monitors the leachate coming off the site via 5 boreholes that have been installed at strategic locations and depths. Periodic monitoring over the last two decades has shown that there is no impact on the quality of the groundwater from the former landfill.

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At the junction, proceed along to your left (the high trail of the Bridle Path). Follow the trail up and around and it loops back to the point where you took the high trail – this will take around 30 minutes. On the way back to the junction, you will come across a vantage point from which you are able to see the Thredbo Sewage Treatment Plant to your left.

15 The plant accepts all sewage flows from Thredbo. Being inside Kosciuszko National Park, the plant has some of the strictest licence conditions issued by the NSW Environment Protection Authority. **Figure 1a** identifies the different stages in treatment that the plant employs.

- **Pre-treatment rooms** - By the use of rotating bar screens, rakes and floatation chambers, the pre-treatment room removes solids, rags, grit, and grease from the raw influent. -
- **Equalisation Basin** - effluent is pumped into the basin from the pre-treatment room through a 'Parshall' flume. The flume has an ultrasonic level detector fitted allowing measurement of the volume of sewage coming into the plant. The Equalisation Basin serves to compensate for peak period loads on the plant by temporarily storing the flow. Pumps in the basin can deliver a near constant load of sewage to the operating tanks.
- **Operating (treatment) tanks** - Raw sewage is pumped from the Equalisation Basin and is distributed evenly to the two operating tanks. Inside the operating tanks, alternating periods of aeration and settlement allow the removal of Ammonia and Nitrogen compounds by the activity of a variety of bacteria cultured inside the tanks. These bacteria live on oxygen

and carbon (sewage) to produce carbon dioxide, water and energy. By bubbling air through the mixture of bacteria and sewage, the oxygen needs of the bacteria are satisfied and the agitation keeps them suspended and in close contact with the sewage. Introduction of certain chemicals control pH and alkalinity and assist in the removal of Phosphorus. When the air is turned off and the agitation removed the biomass will settle out from the sewage thus separating the living organisms from the treated sewage. The treated sewage will remain at the top and is syphoned off and directed via pipes to one of the maturation ponds.

- **Maturation ponds** - used to further treat the effluent from the operating tanks via uptake of excess nutrients by aquatic plants.
- **ADP01 Building** - in 2005, prior to the winter season, Kosciuszko Thredbo contracted Amiad Water Systems to install a tertiary filter system comprising four pressure deep media filter vessels with control system. The system design provides for phosphorus reduction and also provides excellent turbidity reduction, which maximises the efficiency of the downstream UV disinfection plant.

Phosphorus occurs in both natural water and wastewaters and the presence of excess phosphorus in the effluent discharged to natural water bodies has the potential to impact on the water quality. Domestic wastewater flows are the major source of phosphorus levels in Thredbo's municipal wastewater, with about 30 to 50% of the phosphorus coming from human wastes and the remaining 50 to 70% coming from detergents used in laundries and commercial kitchens.

Ultra Violet treatment - This is the last step in the treatment process, and earns the plant a 'tertiary' treatment qualification. Effluent from the maturation ponds

is passed through a channel in which Ultra Violet lights are immersed. As the effluent passes by the lights, the cell walls of any bacteria in the effluent are destroyed, killing them instantly. The treated effluent then passes through a natural wetland filter providing a further polishing effect, and is discharged into the Thredbo River, some 200-300m downstream from the ultra-violet shed.

The plant operators carry out daily tests, which aid in operation and indicate the quality of the final effluent. Every fortnight in winter and monthly in summer, an independent scientific laboratory undertakes physical, chemical and bacteriological testing of the Thredbo River at four locations throughout the village. The results of these tests are forwarded to the NSW Environment Protection Authority.

The University of Canberra Centre for Freshwater Ecology also comes to Thredbo on a routine basis and tests the river at the same four locations for macro-invertebrate abundance. The presence of particular species of these microscopic animals indicates a 'healthy' river.

Continue along the Bridle Path returning to the road.

As you walk the length of the Bridle Path, look down at the river on the left. Can you notice any difference in the colour or other qualities of the river here compared to up near the golf course when you first observed it? Keep an eye out for some of the native wildlife that abounds down this way out of the limelight of the village.

16 Walk along Friday Drive toward the village. At this point there are two options.

Option 1: (You will need a Village Walk Map available from information) Just before you cross Merritts Creek

there is a gravel road heading up below the Gunbarrel chairlift base station. Head left at the top of the gravel road, down towards the Merritts chairlift mid-station. At the midstation turn right and follow this gravel road up the hill, and link onto the Merritts Nature Track, which will take you to the High Noon dam another 250m away.

Option 2: If you do not wish to walk up to the water supply, continue along Friday Drive until you reach the pedestrian bridge crossing Merritts Creek running between Woodridge and Friday Flat – this is the creek from which Thredbo draws the majority of its water.

Thredbo's potable water supply comes from the catchment formed by the surrounding mountains. The High Noon dam located on Merritts Creek provides the inlet for the main village water supply. The inlet fills a 185,000 litre storage tank, with water from the tank then passing through a pressurised chamber filled with ultra-violet light for disinfection. The ultra-violet light destroys the cell walls of any bacteria present in the water, killing them instantly and preventing them from growing again. All water supplied to accommodation and public services in Thredbo is safe to drink and is in fact amongst the purest waters to be found anywhere in Australia.

17 Proceed back along Friday Drive and back into the village, where our bar staff at the Thredbo Alpine Hotel will only be more than happy to fix you a cool refreshing drink.

To find out more about the Thredbo environmental initiatives visit thredbo.com.au/village-life/environment/