

**LAKE JACKSON ECOPASSAGE FEASIBILITY STUDY
POSSIBLE ALTERNATIVES SUMMARY**

The following Matrix is a summary of some possible alternatives to minimize roadkills and wildlife/vehicle incidents along US 27 between Lake Jackson and Little Lake Jackson. The Columns at the far right are for your input. We ask that you rank the alternatives in the “Rank” column, and offer comments or suggestions for the alternatives in the “Comments” column. Your input is important, and appreciated.

ALTERNATIVE	DESCRIPTION	COST*	PROS	CONS	RANK	COMMENTS
No Action	This alternative calls for no action whatsoever.	<\$	<ul style="list-style-type: none"> - No monetary cost is associated with this alternative. - Drydowns are a natural occurrence that only occur, on average, about every 19 years; since mass migrations aren't that frequent, a permanent solution may not be necessary (alternative assumes that local wildlife populations 'bounce back' after mass kills during drydowns). 	<ul style="list-style-type: none"> - Does not address the problem of migrations across road in normal (non-drydown) years. - Does not address problem of mass migration during drydown years (including impacts to animals as well as motorist safety). - Does not help to increase public awareness about the lake ecosystem. - Could lead to increased costs in the long run, if, during another event, the subject has to be revisited (resulting in another study and possible future construction, all of which could have costs affected by inflation and/or higher material and labor costs). - This alternative does not take into account social costs (i.e. collisions with wildlife) and the biological costs (if roadkills have a significant effect on local wildlife populations). 		
Remove and Re-Route The Road	This alternative calls for the abandonment of the existing US 27 ROW, removal of the existing road, and construction of a new segment of the road that goes around the lake.	>\$\$\$\$\$	<ul style="list-style-type: none"> - With the road removed, Lake Jackson and Little Lake Jackson could be restored and reconnected to pre-development hydrological and habitat conditions. - Animals would no longer have to contend with a roadway for migrations, thus eliminating wildlife impacts and human safety concerns. - Additional wildlife habitat could be opened up and created or connected to existing wildlife corridors. 	<ul style="list-style-type: none"> - This alternative is not a practical solution, as an alternate route would need to be identified. Any construction of an alternate route is likely to have additional impacts on the environment. It is not certain that these impacts could be offset by the creation of habitat at the existing road site. - This alternative would be very expensive and the timeframe could be many years, as alternative routes were explored and environmental documentation was completed. - Restoration could be costly and might not be successful. It could be many years before the beneficial effects of a restoration project were documented. 		
Close Road During Migrations	This alternative calls for the closure of the stretch of US 27 within the project study area during mass migrations.	\$ to \$\$\$\$\$	<ul style="list-style-type: none"> - Closing the road during mass migrations would minimize roadkill and traffic accidents caused by wildlife when they are of greatest concern- during periods when large numbers of animals are crossing the roads. - This alternative could be undertaken with no infrastructure, thus minimizing costs and permitting issues associated with construction 	<ul style="list-style-type: none"> - Closing the road is likely not practical, as it is a major connector between Georgia and North Florida and I-10. An alternate route that would not require many miles detour, or that could handle the volume of traffic necessary, has not been identified. - Criteria for when the road would need to be closed would need to be identified- delays in closing the road could result in roadkills or traffic accidents. - Closing the road could prove costly when considering the maintenance of traffic and time lost for detours for those in the transportation industry. 		

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ALTERNATIVE	DESCRIPTION	COST	PROS	CONS	RANK	COMMENTS
Habitat Enhancement Only	<p>This alternative would include enhancement of habitat around the lake edge and adjacent areas only, through regular clearing/bush hogging of overgrown areas and removal of invasive/exotic species.</p> <p>It should be noted that implementation of this alternative, to a certain degree, will likely occur as part of a Maintenance, Monitoring, and Management Plan for any of the following alternatives (with the possible exception of the Temporary Fencing Alternative).</p>	\$	<ul style="list-style-type: none"> - Would enhance potential nesting areas for turtles, possibly minimizing the need for turtles to cross the road in search for suitable nesting areas. - Would help encourage a more diverse ecosystem of native vegetation (as opposed to the monoculture that exists in many areas). - An economical way to possibly reduce cross-road migration in normal (i.e. non-drydown) years. 	<ul style="list-style-type: none"> - Does not address problem of mass migration across road in drydown years. - Does not address problem of migrations in normal (i.e. non-drydown) years. - Managing areas for turtle nesting habitat only; does not totally consider effects on other wildlife species (e.g. mammals and birds) that may use existing overgrown vegetation for food and cover. - Opening up areas may also make them more accessible to humans, which could have a negative impact on nesting and wildlife. Monitoring and maintenance to discourage human impacts would be necessary. - Does not address problem of turtles being killed along roadside as a result of attempting to nest in the open areas along roads. 		
Temporary Fencing Only	<p>Respond to drydown events by installing temporary fencing (i.e. siltfence) along roadway. Fence could be oriented to encourage crossing at existing culvert. Fence would be removed following lake refill/end of mass migration.</p>	\$	<ul style="list-style-type: none"> - Construction and maintenance costs would be low. - Fence would only need to be installed during mass migration (due to drydown). - Likely the least expensive way to minimize roadkills during mass migration periods. - Private property owners along corridor may be more willing to accept periodic temporary fence on their property (as opposed to a permanent structure), thus minimizing need for property acquisition. 	<ul style="list-style-type: none"> - Does not address migrations across road in normal years. - With no maintenance, fence would deteriorate quickly and animals would be able to breach fence, rendering it ineffective. - Frequent brush clearing along fence would be necessary. - With no maintenance, animals attempting to cross too far from culvert may get ‘stuck’ along fence and succumb to exhaustion, dehydration, or predation (including collection by humans). - Would require high level of coordination to get fence installed when necessary. - Does not encourage public to learn about lake ecosystem. - Temporary fence could be considered an ‘eyesore’. 		
or Temporary Fence with Monitoring	<p>Install temporary fence (same as previous option) but have a contracted paid staff supplemented with volunteers to routinely monitor fences twice a day, helping move animals attempting to cross road, as well as maintain fence. Grants or donations could be obtained in amounts that would act as principal trust. The interest accumulated could be used to fund fencing and maintenance.</p> <p>Fence could be removed following drydown events.</p>	\$ to \$\$	<ul style="list-style-type: none"> - Construction Costs would be low. - Current conditions demonstrate this option should be effective in keeping animals off roadway. - Likely the least expensive and most effective way to minimize roadkills during migration events. - Could attract volunteers to help out and could provide opportunity for individuals to learn about area through volunteering. - Volunteer/ paid staff option would lower potential for problems with maintenance/ breaches at fence and animals getting stuck at fence. - Paid staff option could create economic opportunity. - Private property owners along corridor may be more willing to accept periodic temporary fence on their property, thus minimizing need for property acquisition. 	<ul style="list-style-type: none"> - Effectiveness would depend on persons volunteering/working to maintain fence. - Would require a high level of coordination between agencies and organizations to get fence installed and maintained when necessary. - High potential for flaws resulting in roadkills if coordination/monitoring not maintained. - May not effectively address problem of migrations during normal years. - Does not encourage public to learn about lake ecosystem outside of periodic drydown events. - Temporary fence could be considered an ‘eyesore’. 		

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ALTERNATIVE	DESCRIPTION	COST	PROS	CONS	RANK	COMMENTS
<p>Use/Replace Existing Culvert and construct wall</p>	<p>This alternative would involve using/replacing the existing culvert with varying degrees of barrier walls on either side of the highway to divert wildlife to existing culvert.</p> <p>Using “wingwalls” (i.e. walls extending out a few hundred feet from either side of the culvert entrance to help direct animals to culvert) would be less expensive than full walls on either side, but would also be less effective.</p>	<p>\$\$</p> <p>to</p> <p>\$\$\$\$</p>	<ul style="list-style-type: none"> - Available data suggests that wildlife are currently using the existing culvert as passage way; thus its success is known. - Costs could be minimized since the FDOT will need to replace the culvert anyway, thus costs would only be associated with the degree and type of wall (i.e. wingwalls less expensive than full walls). - The visible infrastructure (wall) would be noticed by passing motorists and could be used as an opportunity to educate the public about the lake ecosystem. A wayside kiosk or small visitor center could also be considered for public education (may increase cost depending on type of facility). - Could benefit animals during both normal and event years. 	<ul style="list-style-type: none"> - If wingwalls used, species crossing outside of wall area would not be protected (possibly creating bad PR for project). - If full walls used, species trying to cross far from the culvert may get to the wall and succumb to exhaustion or predation before reaching culvert; design of wall could help to minimize this (e.g. use “flareback” walls spaced accordingly to divert species away from wall to avoid “direction freeze” along a long length of wall). - Careful and regular maintenance of the walls would be necessary in order to ensure their effectiveness (e.g. cracks and vegetation growing up walls would need to be repaired frequently to minimize animals climbing wall). - Construction and maintenance of full walls could be costly. - Private property owners may not be willing to cooperate with wall being built along their frontage. - Most animals would not be able to locate only one culvert along a 3,000-4,000 foot section of roadway, especially when not centrally located 		
<p>Establish Additional Passageways Under Highway</p> <p>- With retaining wall</p> <p>- With full permanent wall on one side</p> <p>- With Full Permanent Wall on Both Sides</p>	<p>In addition to replacing the existing culvert, this alternative would include establishing two additional culverts/passageways in high potential crossing areas to the south of the existing culvert.</p> <p>Additional culverts with “wingwalls”.</p> <p>Additional culverts with full exclusion wall.</p>	<p>\$\$\$</p> <p>to</p> <p>\$\$\$\$</p>	<ul style="list-style-type: none"> - The additional culverts would offer more opportunities for animals to cross road, thus alleviating the potential problem of animals getting stuck along wall (if full wall used). - If wing walls at culvert entrances were used, would still offer more opportunities for animals to cross while still minimizing construction and maintenance costs. - Passageways could be used by animals during normal and event years. - The visible infrastructure (wall) would be noticed by passing motorists and could be used as an opportunity to educate the public about the lake ecosystem. A wayside kiosk or small visitor center could also be considered for public education (may increase cost depending on type of facility). 	<ul style="list-style-type: none"> - If wingwalls used, species crossing outside of wall area would not be protected (possibly creating bad PR for project). - Culverts would likely have to be a great deal smaller than the existing 3.5m culvert; it is unknown whether species will use smaller culverts (some data suggests turtles may not use the smaller passageways). - Careful and regular maintenance of the walls would be necessary in order to ensure their effectiveness (e.g. cracks and vegetation growing up walls would need to be repaired frequently to minimize animals climbing wall). - Construction and maintenance of full walls could be costly. - Private property owners may not be willing to cooperate with wall being built along their frontage. 		
<p>Bridge</p>	<p>This alternative would call for the replacement of the section of US 27 that runs between Lake Jackson and Little Lake Jackson with a Bridge.</p>	<p>\$\$\$\$\$</p>	<ul style="list-style-type: none"> - Would restore natural lake hydrology and habitat. - Would allow animals to cross freely between Lake Jackson and Little Lake Jackson with no interference from vehicles. - Once bridge was built, maintenance of crossing area would be minimal. - Would do the most effective job at minimizing collisions between wildlife and vehicles. - From an ecological perspective, this is possibly the best option. 	<ul style="list-style-type: none"> - The feasibility of this option is severely limited by the cost, which is very high. - Construction schedule for a project such as this would be very long term; thus this option does not address the immediate need for a solution at the location. - Construction of this option could have a negative impact on the existing habitat (though area may improve after bridge is built). - Bridge would only address area between Lake Jackson and Little Lake Jackson; not the areas to the south. 		

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SOME THINGS TO CONSIDER:

1. Walls may not be able to stop birds, various species of frogs (particularly tree frogs), or some larger mammals and snakes.
2. Without proper maintenance, the number of species (and number of animals in general) able to breach the wall will increase, rendering the wall generally ineffective. A Maintenance, Monitoring, and Management Plan will need to be developed for the ecopassage.
3. Costs of walls/ general construction costs could be reduced by using cheaper materials (i.e. wood, cinder block, etc.) however, using cheaper materials may increase overall maintenance costs (i.e. repeated need to replace cracked or broken wood or concrete) as well as affect the landscape (i.e. a “cheaper” materials more likely to result in something that could be considered an “eyesore”).
4. The more “visible” the ecopassage is (i.e. the bigger and better the infrastructure) the more likely the project will be considered something “special” and more likely to attract tourists, naturalists, and create an opportunity to educate public about the area/ecosystem (as well as create the need to build a visitor/education center, which could, in turn, increase tourism).
5. Walls and passageways, in general, can attract a wide variety of natural and human predators. The ecopassage may require security (to prevent poaching/collection of animals along walls) especially during drydown/mass migration events. Migration routes and nesting areas will likewise need to be protected. These issues will need to be addressed in a Management and Monitoring Plan.
6. The cost of security and routine maintenance and signage could be offset by the development of an Ecotourism program that could be contracted out to a reputable company (certified). The income could help offset the costs of some options through direct fees, as well as support the local economy through visitor hotel nights, food purchases, incidental expenses, and visits to other sites in the area. Of course, the success of this would be hard to predict and would be contingent on the effectiveness of the tour company business, PR, and marketing.
7. Wall junctions, corners, and other seams in walls may require sealing at least twice a year. Likewise, vegetation growing up against the wall will require regular mowing/trimming (more frequently in growing season). These needs should be addressed in a Monitoring, Maintenance, and Management Plan. Available information suggests that a wall without a regular maintenance and management program will quickly become a failure.
8. The replacement of the current culvert should be done with the understanding that it is an operational ecopassage under the road. Animals are currently using it. Data suggests that some special passages (which generally have been smaller) have been failures. We recommend that the height and width of the new culvert be duplicated, as these factors are likely the attributes leading to its success.
9. Positioning of additional ecopassages should be established using current data from migrations during and after drawdown events on Lake Jackson.
10. Due to the lack of information pertaining to successful use of ecopassages by turtles and other species groups, as well as information suggesting their apparent failure (i.e. lack of use), it is highly recommended that the current culvert under US 27 between Lake Jackson and Little Lake Jackson be used as a model for height and width for other ecopassages, as it is apparently being used by turtles and other species.
11. Flarebacks and curves on walls must be done at the end of each wall and there should never be a corner where animals get stuck. If there are less than 3 functional Ecopassages under the highway, then flareback walls should be put into place at various strategic locations along the barrier wall. These are walls that come off the barrier walls and curve back toward the lake. This should help to keep turtles from getting stuck in the back and forth syndrome, where turtles get fixated on a direction and move back and forth over a few feet of wall, until they are totally exhausted and die or fall prey to predators who learn to hunt the wall for food.
12. In order to address gaps in the wall which might occur at roads or driveways that intersect with US 27, a cattle guard- like pipe crossing over a concrete box or other suitable structure could be put into place. This would avoid having a point where animals could get on to the highway yet allow vehicle and human access. Periodic maintenance would be required to ensure animals do not become trapped.