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Woodens River Watershed Environmental Organization
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Feb. 22, 2010.

To: Environmental Assessment Branch
Nova Scotia Environment
P.O. Box 442
Halifax, NS, B3J 2P8
Email: EA@gov.ns.ca

From: Richmond Campbell and David Patriquin,
Co-Chairs, Woodens River Watershed Environmental Organization

Re: Comments on the Highway 113 EA.

As co-chairs of the Woodens River Watershed Environmental Organization (WRWEO), we are writing to express concerns related to the proposed Highway 113 and the EA and more broadly about perspectives that are expressed in the EA about maintenance of Mainland Moose in this area.[1] We are respectively Professors of Philosophy and Biology (retired) at Dalhousie University. Richmond's area of concentration is Philosophy of Science, David's is plant and microbial ecology.

In addition to activities focused on the lakes and streams of the Woodens River watershed, WRWEO has a history of involvement in environmental education, notably through The Bluff Wilderness Hiking Trail (constructed and maintained by WRWEO) and, as members of the Chebucto Wilderness Coalition, in the pursuit of protected area status for the Five Bridges Lakes Wilderness Area (FBLWA). This area is adjacent to the areas that will be affected directly by Highway 113. We believe there could be significant impacts on wildlife in the Five Bridge Lakes Wilderness Area as well as within the Blue Mountain Birch Cove Lakes Protected Area (BMBCL).

We hope that with the changes in the global economy, the Department of Transportation and Infrastructure Renewal is looking ahead to an era of new attitudes towards transportation, and that the combination of increased fuel costs and lowered traffic (e.g. through public transportation, carpooling), may render Highway 113 unnecessary. Regardless, the procurement of the lands involved is prudent from a conservation perspective.

Direct Impact of the highway on the Blue Mountain-Birch Cove Lakes wildlife

One concern we have is that Highway 113 would inevitably have significant impacts on the EI (Ecological Integrity) [2] of the Blue Mountain-Birch Cove Lakes Protected Area. To reiterate a point made in a letter in 2006 in response to the Focus Report[3]:

> The reports do not adequately address potential negative impacts of the highway on ecological functioning of the area, nor do they adequately address highway design features to mitigate such effects. Except for impacts on wildlife corridor functions, the Focus Report

and Assessment Study do not discuss in any detail, possible direct negative impacts of the highway beyond the right-of-way boundaries on either the Park itself, or on the adjacent

Resource Lands/Natural Corridor area. There is substantive scientific literature on this topic. The following is an example:

The Ecological Road-Effect Zone of a Massachusetts (U.S.A.) Suburban Highway Richard T. T. Forman* and Robert D. Deblinger, *Conservation Biology* 14: 1523-1739 (2000)

Abstract: Ecological flows and biological diversity trace broad patterns across the landscape, whereas transportation planning for human mobility traditionally focuses on a narrow strip close to a road or highway. To help close this gap we examined the "road-effect zone" over which significant ecological effects extend outward from a road. Nine ecological factors—involving wetlands, streams, road salt, exotic plants, moose, deer, amphibians, forest birds, and grassland birds—were measured or estimated near 25 km of a busy four-lane highway west of Boston, Massachusetts. The effects of all factors extended >100 m from the road, and moose corridors, road avoidance by grassland birds, and perhaps road salt in a shallow reservoir extended outwards >1 km. Most factors had effects at 2–5 specific locations, whereas traffic noise apparently exerted effects along most of the road length. Creating a map of these effects indicates that the road-effect zone averages approximately 600 m in width and is asymmetric, with convoluted boundaries and a few long fingers. We conclude that busy roads and nature reserves should be well separated, and that future transportation systems across landscapes can provide for ecological flows and biological diversity in addition to safe and efficient human mobility.

(Underlining is ours)

These sorts of impacts do not seem to have been addressed in the EA. It seems very clear, given the relatively small size of the BMBCL Wilderness Area and its proximity of a long stretch of or the proposed highway, that the highway will, inevitably, seriously undermine the EI of the protected area. At the same time, proposed development on the opposite side threatens its integrity from that direction.

Another concern is the direct destruction of significant wetlands that would be involved; however, it is very likely that you will be receiving a lot of comments in this regard and we will focus on our main concern which is the issue of the mainland moose and conservation corridors.

Mainland Moose and Conservation Corridors

The following statements extracted from the EA, amongst others, are the basis for our concerns:

Impacts on mainland moose and deer and fragmentation/impacts on existing ecological integrity of the area (includes Blue Mountain/Birch Cove Lakes)
Studies by NSDNR on the spatial distribution and abundance of Mainland Moose have shown that there is a small population that exists on Chebucto Peninsula but several winter aerial and radio-tracking studies have shown that this small population limits its range to the Chebucto Peninsula and the range would not be fragmented by the proposed highway as the population does not usually venture close to the proposed alignment or the Blue Mountain/Birch Cove Lakes Wilderness Area. TIR will provide a structure between Maple and Fraser Lake with an opening large enough for large mammals to pass. Therefore, impacts on mainland moose and deer are not significant. In addition, the use of open span culverts will allow for movement of small mammals and herpetiles. Hydraulic connectivity of wetlands crossed by the highway will be maintained.

The area south of the study area is a Species At Risk Habitat for an isolated population of mainland moose (NSESA Endangered);
• The Fraser Lake/Maple Lake system is identified by NSDNR as a Habitat of Concern. This system is inhabited by sensitive fish species, brook trout and gaspereau. As well, the previous EA identified the area between Fraser Lake and Hammonds Plains Road as an important wildlife corridor.

This population on the Chebucto Peninsula are not considered sustainable by NSDNR and as such there is no area specific recovery plan in place (Tony Nette, NSDNR personal communication, 2009). Specifically, the surveys conducted in 2003, 2008 and 2009 suggest the Chebucto population is more or less stable. A combination of ground and winter aerial surveys along with radio tagging suggests they are no longer moving off of the Chebucto Peninsula. The NSDNR continue to solicit sightings from the public of live animals, scat or antlers as part of its ongoing surveys. The NSDNR suggest that the Chebucto moose in particular seem very wary of humans, whether on foot or on ATVs and off-highway vehicles (OHVs) (Tony Nette, NSDNR personal communication, 2009).

Winter aerial survey programs were conducted by NSDNR in January 2003 and 2009 to assess the numbers and distribution of moose in the Chebucto Peninsula and within the vicinity of the proposed highway alignment of Highway 113. A total of 24 to 25 moose were observed, with the majority (22) of the population being identified in the western portion of the peninsula, between Route 333 and St. Margaret's Bay, in the vicinity of the Five Island Lake and the Terence Bay Wilderness Area and not along the proposed Highway 113 (AMEC, 2004; Tony Nette, NSDNR personal communication, 2009).

Recent investigations undertaken by NSDNR with radio-collared moose (NSESA Endangered) between 2004 and 2006 and winter aerial surveys (2003 and 2009) do not indicate that the small population in the Chebucto Peninsula frequent the Highway 113 study area. Figure 9-5.1 illustrates GPS collar data of six different moose instrumented between January 28, 2004 and March 6, 2006. Figures 9-5.2 and 9-5.3 show results of winter survey, January 2003 (100% search) where a minimum of 25 moose at 12 locations were found and results of winter survey,
January 2009 (100% search) where a minimum of 28 moose at 13 locations were found.

For concerns related to mainland moose, studies by NSDNR on Moose populations on the Chebucto Peninsula demonstrate that these individuals do not commonly migrate to the areas affected by the proposed project.

(Underlining is ours)

Our comments:

1. Moose do, apparently, migrate above Highway 103, likely in higher frequency than suggested.

The EA appears to attempt to minimize the significance of moose movement into the BMBCL area. (statements above). However, one of the fact sheets distributed at the January Public Open House for the proposed Highway 113 January 26th, showed a map with “Reported Moose Sitings in Proposed Highway 113 Project Area between 2004 and 2009”. This figure does not appear to be in the EA report nor, apparently, are the sightings discussed therein. (We could be wrong; if present, they certainly are not highlighted, which adds to our concern about DNR perspectives towards the Chebucto Mainland Moose.) The map shows eight sightings north of Highway 103 and five close to or on the highway 103. It is likely there were many more occurrences than sited. Interestingly, after circulating a draft of this letter to the WRWEO board today, one board member wrote back:

In the interests in accuracy, I am troubled by the inaccuracies I perceive in moose sightings in the area, and the weight that might have been attached to those numbers. During the period in question, I personally can attest to 4 sightings near the intersection of Route 3 and 103:

1) a juvenile moose in my back yard (north end of Frederick Lake)
2) a young moose wading in the brook that feeds into the north end of Frederick Lake.
3) my neighbour's report that there was a full grown moose on the highway by the 3 / 103 overpass.
4) my friend's report of a large moose standing on his lawn. (last house on Five Island Rd. before Cambrian Cove)
... these all during the same period as the mapped reports.

Therefore, and this is just one person's information (mine), I fail to see any credibility in the map of sightings. Hopefully not much weight is attached to the map.

The Map is shown on the next page.

2 We are quite disappointed (if not disheartened, given our history in efforts to realize protection for FBLWA) by the statement that "This population on the Chebucto Peninsula are not considered sustainable by NSDNR and as such there is no area specific recovery plan in place." We suggest that maintenance and enhancement of this group should be a priority for the following reasons:

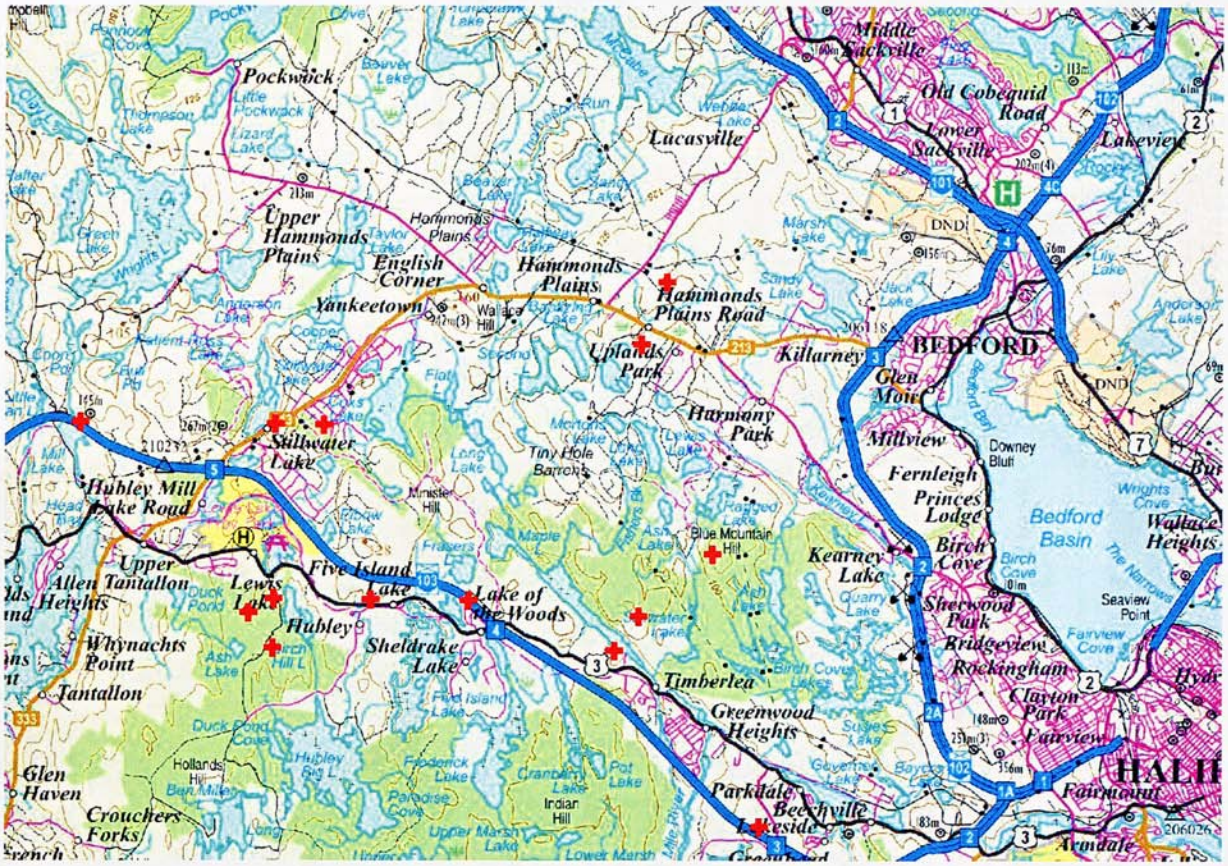
(a) By this logic, even some, most or all of the larger groups might be considered non-viable by wildlife demographers. Beazley et al.[4] estimated the 50/500 rule-of-thumb values for mainland moose to be 50 and 5000 moose respectively, meaning that for an isolated population to survive over decades (e.g., 50) or longer term (e.g., 5000 years), they would need to contain 50 or 5000 individuals respectively. The latter number is well above the total population in N.S.

The authors, which include DNR personnel, recognize many limitations to those estimates and urge: "Until the information gaps can be addressed, it is prudent to adopt a precautionary and adaptive approach to the recovery of this species." We suggest that maintenance and even enhancement of the Chebucto group would be consistent with a precautionary and adaptive approach.

(b) The Mainland Moose is a legally protected species, which requires, we understand, protection of all groups, regardless of size.

(c) The small, more isolated groups should not be dismissed as irrelevant to long term survival of the Mainland Moose in N.S.

It is quite conceivable, for example, that a large percentage of the larger groups, but not of the smaller more isolated groups could be wiped out by disease, and that one or more of these smaller groups would be important to repopulation. Certainly they are numerically sufficient to act as a seed group, judging by the experience of Newfoundland and Cape Breton. There would likely be reduced heterozygosity. However, we suggest that the appropriate strategy is to maintain the Chebucto group and *increase its size and heterozygosity* by bringing in orphaned moose from N.B. (which are the same genetic



Reported Moose Sitings in Proposed Highway 113 Project Area between 2004 and 2009 (DNR)

lineage, unlike the C.B. moose). As we understand it from the DNR presentation in the spring at Tantallon, the Chebucto group is healthy and the area provides good habitat for them – so why not capitalize on that situation? Also, we understand, their numbers are much more easily monitored than other populations, so they are a good case study for conservation efforts.

We are both quite familiar with some of the moose habitat, Richmond through his years of hiking in the Bluff Trail area and canoe excursions over the larger area and sightings of moose, footprints etc.; David and Nick Hill recently documented an old growth stand on Umlah Hill that is surrounded by wetlands and in which there were many signs of moose.[5] We have discussed at and following the DNR presentation on moose at Tantallon in the spring, the possibility of some restriction of activity on parts of the Bluff Trail seasonally, or even closing down the more remote loops… citizens are prepared to contribute to moose conservation!

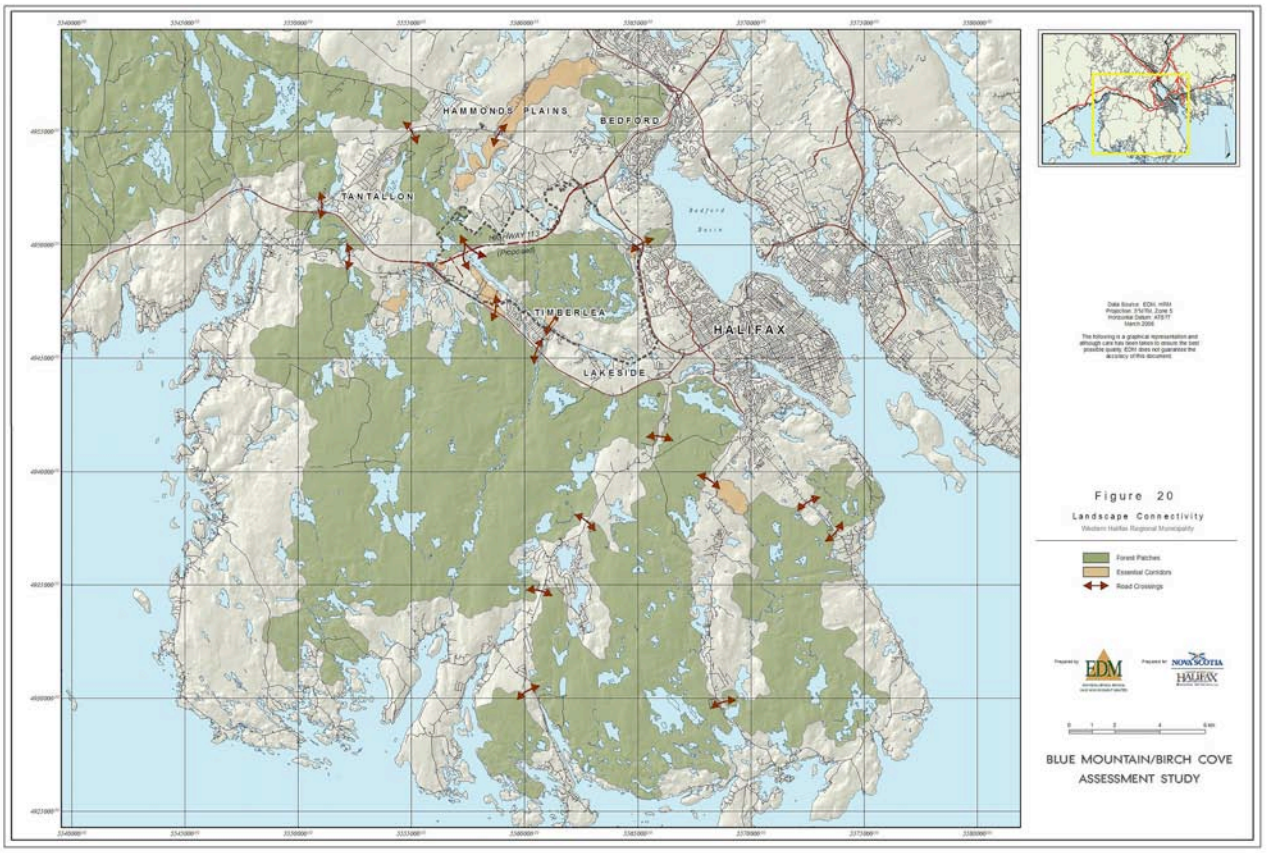
d. Conservation corridors benefit all species and are critical for long term species richness of all of the protected areas on and adjacent to the Chebucto Peninsula.

The EA and the Focus report are both somewhat vague on the precise nature of possible conservation corridors and we get the impression this is not a high priority issue, e.g., for the Fraser Lake area, there is not much more information than "the previous EA identified the area between Fraser Lake and Hammonds Plains Road as an important wildlife corridor." This area is of particular interest to us because it is (or was historically or is potentially) a corridor for movement between the FBLWA and the greater mainland:

→See next page: Figure 20 from the Focus Report

The Regional Plan for HRM[6] has likewise highlighted this area and indicated their intention to collaborate with TPW, and DNR:

> **5.4.3 Natural Corridor**
> The Crown and private lands lying to the south and west of the generalized park area form an important natural corridor, providing connectivity to the more extensive Crown and Bowater lands to the south and west, refer to Figure 21, Generalized Concept Plan. A critical link in this corridor is at Maple Lake/Frasers Lake where the proposed Highway 113 corridor crosses the lake system. The highway will be located on one of the few remaining "necks" of land available for species movement. The Piercey Investors subdivision development on their lands
> to the west of the lakes may present a significant complication for this initiative. HRM should work with landowners, TPW, and DNR to ensure the preservation of adequate connectivity in this area, consistent with the Open Space Functional Plan proposed in the draft Regional Plan.


HAMMONDS PLAINS
BEDFORD
TANTALLON
HIGHWAY 113
(PROPOSED)
TIMBERLEA
HALIFAX
LAKESIDE
Bedford Basin
Figure 20
Landscape Connectivity
Western Halifax Regional Municipality
Forest Patches
Essential Corridors
Road Crossings
EDM
NOVA SCOTIA
HALIFAX
BLUE MOUNTAIN/BIRCH COVE
ASSESSMENT STUDY

As noted above, there does seem to be, still, significant movement of moose through this area, despite the hazards involved. We therefore urge that very serious attention be given to corridor protection as soon as possible. Not discussed in the Focus Report or the E.A. are possible options for such corridors (adding to our concern that they are not high priority). Corridors might include, for example, electronic crossings of highways.[7]

A key important additional facet of the corridors is that they are very critical for the long term species richness and broader EI of all protected areas (including parks) on the Chebucto Peninsula and adjacent mainland areas, not just for larger animals such as moose. There is a lot of emerging literature in this area. Amongst the key papers:

A 2002 paper by Tewksbury et al. (Title: Corridors affect plants, animals, and their interactions in fragmented landscapes) reported on a large field-scale experiment designed to to test hypotheses about benefits of corridors and alternative designs. In that study they documented that:

> …corridors not only increase the exchange of animals between patches, but also facilitate two key plant–animal interactions: pollination and seed dispersal. Our results show that the beneficial effects of corridors extend beyond the area they add, and suggest that increased plant and animal movement through corridors will have positive impacts on plant populations and community interactions in fragmented landscapes.

A 2009 paper by Lars A. Brudviga, (Title: Landscape connectivity promotes plant biodiversity spillover into non-target habitats) introduces the concept of "spillover" (coming from marine fisheries reserves), noting:

> Working in the world's largest corridor experiment, we show that increased richness extends for approximately 30% of the width of the 1-ha connected patches, resulting in 10–18% more vascular plant species around patches of target habitat connected by corridors than around unconnected but otherwise equivalent patches of habitat.

Such spillover in effect increases the habitat protecting native species, a huge bonus to constructing them.

The connections provided by corridors are ultimately important for all species in a fragmented landscape. One reason that the significance of corridors is not, perhaps, broadly appreciated, is that the effects of NOT giving priority to this aspect of efforts to protect native landscapes and species may require many years to become obvious. Such effects, however, are predictions of very well based conservation theory and are the basis of concern about future losses by Harvard's E.O. Wilson. His Rule of Thumb states that for a 90% reduction in total species area, there is on average a 50% reduction in the total species carrying capacity of the area. But that does not mean immediate loss, rather loss over longer periods of time as local populations go extinct and are not repopulated by immigration from connected areas. It might take 10, 50, or even 200 years to begin to see these effects locally, but it is virtually certain that, in the absence of counter measures, they will occur. (An analogy might be zoos that do not have venues for replacement when they lose species.)

(e) The Chebucto moose are potentially an invaluable tool for promoting conservation, perhaps even for bringing additional funds.

Large animals capture our imagination and empathy. Think of the challenge: to demonstrate that we, as 21st century humans, can co-exist with this elusive animal that resides next door to an urban population climbing toward a half a million persons. There is somewhat of a parallel in the Florida panther:

> When you purchase a panther license plate, your donation goes directly to supporting our beautiful cats, .but also because it would help to protect other valuable environmental resources, such as wetlands, aquifer-recharge areas, drinking water supplies and the habitat of other endangered species.
> Florida Panther.
>
> In 1982 the students of Florida elected the magnificent Florida panther (Felis concolor coryi) as the official state animal of Florida. A large predator (can grow more than 6 feet in length), panthers play an important role in the ecosystem.
>
> Florida panthers were persecuted to near-extinction out of fear and misunderstanding (folklore refers to them as "catamounts"). The Florida panther was listed on the federal endangered species list in1967, and on the state of Florida's endangered list in 1973.
>
> See license plates at http://www.buyaplate.com/panther.html

Efforts to protect the Florida panther have received broad support in Florida, even though their long term survival is probably more precarious than that for Nova Scotia's mainland moose. It has resulted in many conservation areas and corridors being protected, wildlife personnel justifying the expenditures on the basis that it is simply good for conservation as a whole.

We suggest that a similar approach to the Chebucto Moose (indeed all moose, and other endangered species) would be successful in Nova Scotia. The Piping Plover license plate is an important source of funds for protection of that species in N.S. now. Why not feature Chebucto moose on a special license plate available in HRM and use that, in combination with strong commitments to protection, genetic diversification, corridors etc. to engender public support for conservation efforts?

We thank you for your consideration of these comments.

Richmond Campbell *David Patriquin*

Co-chairs, WRWEO

cc:
WRWEO membership
Bill Estabrooks, Minister, Energy, Transportation and Infrastructure Renewal
Sterling Belliveau, Minister, Environment
John MacDonnell, Minister, Natural Resources
Raymond Plourde (EAC Wilderness coordinator)
Chris Miller (CPAWS)
CWC Steering Committee

Notes

1. In this letter we refer to the EA (Environmental Assessment) submitted by Nova Scotia Transportation and Infrastructure Renewal (TIR) on October 16, 2009 and for which comments were due by Feb. 22nd, 2010 (today

We also refer to the

Focus Report for the Proposed Highway 113
Class I Environmental Assessment
Submitted by TIR in March 2006.

Both sets of documents are available at http://gov.ns.ca/nse/ea/highway113.asp

2. For a recent review paper which includes discussion of the concept, application and monitoring of EI, see: LaPaix, Freedman, & Patriquin. 2009. Ground vegetation as an indicator of ecological integrity. *Environmental Reviews* 17: 249–265.

3. Patriquin, D. , S. Adl, B. Freedman, A. Horn, M. Leonard, C. Herbinger, D.B. Scott, S.J. Walde, 2006. Possible Impacts of Highway 113 on the Proposed Blue Mountain/Birch Cove Lakes Park and the Need for Strengthened Protection of the Park and the Adjacent Resource Land/Natural Corridor Area. Brief submitted to Environmental Assessment Branch, Nova Scotia Department of Environment and Labour & to Regional Plan Public Hearing, Halifax Regional Municipality. Available at: http://dp.biology.dal.ca/dp/bluemountain/index.html

4. Beazley, K., M. Ball, L. Isaacman, S. McBurney, P. Wilson, and T. Nette. 2007. Complexity and information gaps in recovery planning for moose (*Alces alces americana*) in Nova Scotia, Canada. *Alces* 42: 89-109.

5. See http://versicolor.ca/forest/
A more detailed, Draft Report was forwarded to NSE/DNR on Sept. 6th, 2009.

6. The HRM Regional Plan (2006)
http://www.halifax.ca/regionalplanning/FinalRegPlan.html

7. See next page, article on use of electrobraid fencing for wildlife crossings
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8. Tewksbury et al. 2002. Corridors affect plants, animals, and their interactions in fragmented landscapes. *Proceedings of the National Academy of Sciences,* 99 (20): 12923–12926

9. Brudvig et al. 2009. Landscape connectivity promotes plant biodiversity spillover into non-target habitats. *Proceedings of the National Academy of Sciences,* 106 (23): 9328–9332

New Mexico
WILDLIFE NEWS
www.wildlife.state.nm.us
Tod Stevenson, Director

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New Mexico Department of Transportation
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FOR IMMEDIATE RELEASE, SEPT. 14, 2007:

ELECTRIC FENCING, HIGHWAY MATS GIVE WILDLIFE SAFER PASSAGE IN TIJERAS CANYON

TIJERAS -- Deer and other wildlife now can commute more safely between habitats in the Sandia and Manzano mountains east of Albuquerque with the activation of electric fencing and highway mats designed to provide the animals safe passage over and below Interstate 40 and N.M. 333, formerly Route 66.

Turning on the power was among the final steps in the development of a $750,000 system to reduce wildlife-vehicle collisions along five miles through Tijeras Canyon . Representatives of the New Mexico Department of Game and Fish, Department of Transportation, the Tijeras Canyon Safe Passage Coalition, and the Wild Friends group gathered Tuesday for the ceremonial "flip of the switch." The electrical system is a vital component of the project, which also includes 8-foot wildlife-proof fencing, passages under existing overpasses, warning signs and solar-powered motion-detecting cameras that turn on highway caution lights.

"This is the only system of its kind in New Mexico and among only a few in the United States ," said Mark Watson, a habitat specialist with the Department of Game and Fish. "We're expecting it to significantly reduce vehicle-wildlife collisions in Tijeras Canyon and reconnect Sandia and Manzano mountain wildlife habitats."

The project has roots in the 2003 Legislature and House Joint Memorial 3, sponsored by Rep. Mimi Stewart and supported by the conservation group Wild Friends . The memorial directed the Department of Game and Fish and the Department of Transportation to work together to reduce wildlife-vehicle collisions in New Mexico .

"Safety was a key issue when tackling this project," said Transportation Secretary Rhonda Faught. "This particular wildlife crossing was identified among the four highest risks areas in the state where large game animals and vehicles collide. With the additions to the new corridor, we are creating a safe passage for wildlife and safe travel for people."

The 7-foot-high Electrobraid fencing is designed to deliver a mild shock to animals that touch it, discouraging them from passing through. The fences consist of several horizontal strands of black rope-like material that is about a half-inch in diameter. The fence can deliver a 6,000- to 7,000-volt, 4 milliamp shock for 3/10,000th of a second -- enough to sting, but not seriously harm a human. The fence will be monitored by satellite 24 hours a day by the Electrobraid Fence Company in New Brunswick, Canada.

The project also includes seven Electro-mats, which are built into roadways and act like electrical cattle guards, preventing wildlife or other animals from crossing. The approximately 4-foot-wide mats span the roadways in five locations along N.M. 333 and across the I-40 on- and off-ramps at Tijeras. The mats along N.M. 333 are designed to encourage wildlife to cross the road in designated areas where motion-detecting cameras and caution lights will alert motorists to slow down when wildlife are present. The on- and off-ramp mats are designed to keep wildlife off the freeway. Twelve specially designed escape ramps were constructed in case animals somehow become trapped inside the fencing along I-40.

Pedestrians wearing shoes will be able to safely walk across the Electro-mats. Bicyclists also can safely cross the mats. However, the mats will deliver shocks to dogs, horses or people without shoes.

The additions to the wildlife corridor were included in the $27 million GRIP I-40 Carnuel-to-Tijeras project. Governor Richardson's Investment Partnership, or GRIP, is a $1.6 billion transportation initiative aimed at improving the state's highways, while creating thousands of local jobs.

The Department of Game and Fish will monitor Phase I of the system to evaluate its effectiveness in reducing vehicle-wildlife collisions and directing wildlife to safe passages across and under the highways. Should it prove to be ineffective, the Department of Transportation's Phase II and Phase III strategies call for more passages, possibly including a land bridge over I-40.

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