

Michaux State Forest Target Range Report

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Overview

This report summarizes the perspectives developed through the work of a task force convened to assist Michaux State Forest Managers discern the future feasibility of the district's public target range.

The target range was closed in June 2010, due to increasing deferred maintenance issues, a need to develop baseline measures of lead and other contaminants associated with small arms ranges on the site, and chronic misuse and vandalism at the site. Over the last year, the task force identified a number of critical issues that needed to be addressed in order to determine the feasibility of providing continued public target range opportunity on the Michaux. These issues included:

- Environmental Impacts:
 - Lead and Other Contaminant Impacts
 - Public Health/Water Supply
 - Wildlife Impacts
 - Non-lead Wildlife Impacts
- Recreational Conflicts
 - Noise
 - Traffic Congestion
 - Vandalism/Littering
 - Public Safety
- Budget Constraints and Prioritization/Expenditure of Public Funds
 - Availability of Funds
 - District management capacity to deal with rate of use/misuse of target range
 - Ability to administratively manage and enforce target range access and use

Along with identifying critical issues to be weighed by DCNR managers and state forest stakeholders, the task force developed a prospectus for a baseline site characterization study of the existing range as well as reviewed bid proposals and study results. They also solicited outside expert input to help generate more informed perspectives on the identified issues. The issues section of this report summarizes the range of perspectives and opinions currently held by members of the task force based on these efforts. Finally, the task force identified four objectives they felt were critical for DCNR to meet in order to arrive at a publicly sustainable decision regarding the feasibility of supporting future public target range activities on the Michaux. These objectives include:

- 1) Minimize Cost
- 2) Minimize (Negative) Environmental Impact
- 3) Maximize Recreational Compatibility with Other State Forest Uses
- 4) Maximize Public Availability

The task force also identified four potential decision outcomes to be weighed against how well they optimized the four objectives. Using an analytical tool known as a Consequence Table, they assigned subjective weights to the four objectives and ranked each outcome based on how well they thought it would achieve each objective. The report summarizes some of the complexity inherent in ranking decision outcomes against these four objectives as well as the simplifying assumptions made by the task force in this initial attempt at determining a most feasible decision outcome. Based on their work to date, the task force members feel it is critical for DCNR decision makers to solicit a broader base of public input into the decision making process at this point and hope this report will support an informed and constructive decision making context regarding the future of the Michaux's target range.

**Michaux State Forest
Target Range Task Force
Progress Report**

September 1, 2011

Purpose

The purpose of this report is to summarize the issues identified, information gathered, and objectives and alternatives developed by the Target Range Task Force over the past year. The primary audience is DCNR, Bureau of Forestry, Executive Staff. The intent of this report is to lay the foundation from which to support an informed dialogue on the part of DCNR decision makers and Michaux State Forest stakeholders in order to arrive at an ecologically, operationally, and politically sustainable decision regarding the future of target range activities on the Michaux State Forest.

Problem Statement

The Michaux Target Range experiences intense use by both hunters, an important recreational user of the state forest and shooting sport enthusiasts from among the state forest's many other user groups. However, as a high impact activity, supporting publicly accessible target range activities on the Michaux incurs costs from a political, operational, and ecological perspective and raises questions about the level of priority it should be given based on agency mandate and resource constraints. Making sustainable decisions within this context requires that Michaux managers are able to explain how and why resources are allocated to supporting target range activities in a manner that is credible and consistent with DCNR's mission.

Ensuring that target shooting takes place responsibly; where public safety, recreational compatibility, and environmental impacts of the activity can be monitored and managed is in the public's best interest. However, there is fundamental uncertainty about the extent to which continued provision of a public range reduces illegal or irresponsible target range activities on the Michaux or surrounding landscape. This makes it difficult to measure the public value trade-offs between the costs and benefits of continuing vs. discontinuing public target range activities on the Michaux, or the relative advantages of providing it through adaptive strategies that minimize up-front costs while sustaining high levels of public availability to the target range (on the assumption this availability is minimizing less desirable target shooting behaviors elsewhere) vs. strategies that accept permanent or temporal cessation of formal target range activities to minimize measurable publicly born costs or other liabilities in the provision of public target range opportunities. Local DCNR managers and stakeholders are seeking a politically, economically, and ecologically sustainable determination on the feasibility of continuing public target range activities on the Michaux State Forest within this context.

Past and Current Status of Target Range Activities on Michaux State Forest

Recreational hunting is an important recreational use of the state forest system; and one that supports significant economic activity as well as direct public revenue through the sales of goods, services, and hunting licenses. Target shooting to hone marksmanship, train young hunters, or zero firearms prior to hunting season represents a common corollary activity and interest among hunters. State Forest Rules and Regulations have historically identified target shooting on the state forest system as an “illegal use,” but have also recognized the need to meet and manage hunter’s needs for a target range within the state forest system by allowing district managers to identify “approved” target range areas on state forests to be managed according to guidelines established by State Forest Division of Operations. (See Appendix 1)

In early years of the agency, many district foresters across the state often approved numerous ranges within a given district at the request of individual hunting camps or even individual state forest camp leases. However, as managers confronted the increasingly complex issues of ensuring responsible use at multiple sites, most began to move towards providing one official site within a district where target range activities would be allowed and, hopefully, managed sustainably. Over the past decade, due to the elevated public concerns about the impacts of lead and other contaminants associated with target ranges, as well as the increased management costs of maintaining public ranges alongside of other state forest recreational uses, all but one of these official target ranges within the state forest system has been closed.

Recognizing both the unique landscape context of the Michaux and the high levels of public demand for a public target range in the area, Michaux managers have continued efforts to meet that demand to the best of their ability. While other target range operations exist in the area (a Pennsylvania Game Commission range in Carlisle, and at least six Hunting Clubs around the state forest which provide target range access to members), the target range opportunity on the Michaux is singularly appealing to many current users for at least two readily identifiable reasons based on anecdotal communications with permitted users:

- 1) Given the density of the local population, there are many individuals with limited target range use interests (e.g. individuals who only want to fire a few rounds per year to sight in a new scope, or ensure their rifle is zeroed prior to deer season). For such individuals, the forty + mile drive to Carlisle or a \$60-\$80 dollar annual membership fee represents a high cost per unit of need for target range use.
- 2) Given the Michaux range’s proximity to other outdoor recreational opportunities, it represents an ideal location for a range for the hunters and shooting enthusiasts scattered among the forests many other user groups (i.e. Mountain bikers, hikers, horse-back riders, kayakers, ATV riders, etc. who are also hunters or shooters and will avail themselves of the range during visits to the forest to pursue their other recreational interests.)

However, in the past decades, target range management issues on the Michaux (as elsewhere) have grown increasingly polarized given growing recognition of lead and other contaminant issues associated with small arms ranges, as well as a more generalized polarization over expenditures of public funds. Further, as target range opportunities, both public and private, become more expensive or simply eliminated due to increased costs associated with range management, the rate and intensity of use of the Michaux range has only increased, further exacerbating resource allocation and range management decisions for the district.

In 2000, in an effort to respond to recreational use conflicts and potential environmental impacts, district managers secured a grant from the National Rifle Association to relocate target range activities to avoid growing recreational and environmental concerns with the historic range (proximity to Caledonia State Park and the intake valve for the Chambersburg water supply.) Implementing the grant ran into considerable resistance from residents some distance away from the proposed site, and the project was canceled. The current range was then installed on a heavily disturbed site used as a “borrow” area (i.e. a place where fill material was excavated) during the construction of the Long Pine Run Reservoir (See Appendix 2).

Range Use Permits for this site were distributed beginning in 2004. At first, names and addresses were recorded in an electronic database, but as demand for permits grew, staff resources shrank, and management use of the permit contact database remained elusive, efforts to record permittee contact data were discontinued and permits were simply distributed to anyone requesting one. Currently, there are 3,261 permitted users for this range.

On June 6, 2010, the range was temporarily closed in order to provide time for staff to clean up following a vandalism event. Due to the coincidence of this event with a vacancy in the District Forester position, the decision to reopen the range was deferred until a new District Forester was in place.

This report is a summary of the efforts to date by the new district management team, along with the input provided by a four member task force that has been tasked with identifying and understanding issues associated with the feasibility of supporting target range activities on the Michaux in the future. It is hoped that this progress report will serve to engage DCNR and Bureau of Forestry executive staff in the decision making process and to constructively support further engagement with local elected public officials and other Michaux stakeholders in the decision making process.

I. Issues Identified by the Task Force

This section provides a brief narrative of the key issues identified during Task Force meetings as critical to determining the feasibility of continued range operations. Following the description of each issue, current areas of consensus and divergence among members of the task force are outlined along with acknowledged areas of uncertainty that could be explored further in the decision making process should they be deemed critical to decision outcomes.

A. Environmental Impacts

There are acknowledged environmental impacts of target ranges that not surprisingly make considering it as a use on public lands set aside for conservation purposes potentially polarizing. The following is a brief summary of task force discussions regarding the various forms of environmental impacts associated with small arms ranges and their relevance to the feasibility of continued range activities on the Michaux

1) Lead/Contaminant Issues

Lead and other contaminants associated with the discharge of firearms are a well recognized and much studied environmental impact of target ranges. Task Force members were particularly worried about lead impacts to both public safety (drinking water contamination) and wildlife (primarily through ingestion by birds, though impacts to other organisms through high levels of contaminants in aquatic environments is also documented), as numerous studies have identified both as potential negative impacts of lead and other contaminants deposited on target ranges.

Given the salience of this issue within the political context of target range management generally, and the proximity of the current range to Chambersburg's water supply, the Task Force agreed that establishing a credible baseline on lead and other contaminants was needed before other feasibility issues could be adequately assessed. They were instrumental in assisting district managers develop, solicit and review qualified bids, and review the baseline site characterization study. (See Appendix 3, and Target Range Baseline and Site Characterization Study report.)

However, members of the task force take divergent views as to what represents a responsible integration of study results into the determination of whether or not continued site use as a target range is feasible.

One view is that since the findings of unacceptably high levels of contaminants are where you would expect to find them in front of the shooting stations (from the muzzle blast discharge) and around the

backstop areas, they represent impacts that can and should be mitigated as a routine part of responsible range management. Since the study was unable to detect problems in the “scatter zone” (i.e. the broader area behind the target areas where errant or irresponsibly fired bullets or unlawful projectiles such as birdshot would end up) this perspective is also inclined to stress that from the best available evidence, range usage must be largely responsible, and evidence of birdshot use and “unofficial” target areas within the scatter zone the result of relatively infrequent violations. Furthermore, likelihood of future negative impacts in the scatter zone could be significantly reduced through a combination of better shooting station engineering and more strategically deployed enforcement efforts and user group outreach and self-policing efforts. Finally, this perspective stresses that employing new backstop technologies would allow for cost-effective clean-up of lead and other contaminants around target areas in the future, making any potential negative interactions with local wildlife populations or the local water supply an extremely low and acceptable risk. This view also worries about the uncertainty factor of where target range activities will take place should the range close, and whether that would represent a more or less desirable outcome than dealing with the measurable impacts of a managed public range site.

The other view is that since range use has already contributed to such high contaminant levels in areas you would expect them; and since there is observable evidence that there is also irresponsible and illegal discharge happening all too frequently at the site; even if current mitigation costs might be manageable, what the baseline study suggests is lead mitigation at this current site will only be a sleeping time bomb for someone to deal with down the road. Eventually, the incidental, but inevitable irresponsible or illegal discharge of errant bullets or birdshot will begin to create hazardous levels of contaminants in the scatter zone area that will become detectable by contaminant monitoring studies, and at that point represent a much larger public burden to mitigate. This view also considers the potential of the lead on the site as an unacceptable risk to waterfowl and other birds that might use the site as dusting or feeding areas, and is persuaded that prioritizing continued target range use over wildlife safety, or deferring potential future problems due to existing lead issues (i.e. groundwater or down tributary migration of contaminants) makes continued use of this site as a target range unfeasible, or at least irresponsible given DCNR’s mission. Closing this site and either relocating the activity to a more easily mitigated location or terminating range activities on the forest altogether, represents the more responsible decision, and this view would stress that illegal target range activity on the state forest is no different than any other law enforcement issue faced by the Department and should not be considered as a feasibility factor since there are other legal range options in the vicinity of the Michaux that

could absorb those committed to pursuing this activity in a legal and responsible manner.

Potential Lead-Issue Mitigating Factors

- Existing lead level clean-up at target areas and shooting stations
- Sand trap area at shooting areas (to easily recover brass and remove contaminants)
- Bullet trap backstop technologies (allowing for routine and “non-expert” lead reclamation)
- Blue sky reduction technologies
- Surround berms

2) Site Disturbance/Use

The general intent of state forests is to provide habitat for wildlife and native plants, and to provide a place for the public to enjoy outdoor recreation in a “natural” environment. The Bureau of Forestry has historically stressed the need to focus its own particular recreational programming towards “dispersed, low-density outdoor recreation” to minimize interference with other critical aspects of its mission (active forest management, etc.) Obviously, a target range requires the construction or maintenance of a cleared space that is heavily geared towards intensive human use and activities, requires numerous forms of engineered infrastructure, and on which many natural processes (water and mineral cycles, forest succession, etc.) will be drastically impacted or eliminated. Not only does the target range area mean that native animals and plants will no longer be able to occupy the site, but it also represents what ecologists call a “fragmenting feature” on the landscape, meaning it potentially represents a barrier to some organisms’ or populations’ ability to sustain themselves on the surrounding landscape.

While all members of the task force acknowledge the reality that there are inevitably environmental impacts associated with the ongoing presence and use of the site itself; there were widely differing opinions about the level of impact this should have on the decision. Some felt that the past use of this site as a borrow area for fill during the construction of the nearby reservoir, and the fact that little vegetation clearing was needed to establish the site suggests almost negligible environmental impact should be attributed to its continued use as a target range (as most of these impacts were incurred for other infrastructure development reasons), and that what impacts there were from continued use (erosion, invasive/weedy species colonization, lead issues, etc) could, and should, be carefully monitored and mitigated through responsible range management strategies.

The other perspective is that despite its past disturbance and use history, given its proximity to the reservoir and the unique forms of wildlife it attracts to the Michaux (waterfowl, osprey, and bald eagles), its mere presence represents an unacceptable environmental risk to current species of interest; while also preventing re-colonization/succession of the disturbed site to a healthier forested state.

3) Non-lead Wildlife/Natural Community (waterfowl, birds, amphibians) Impacts

Range impacts other than lead were also identified as issues for investigation in determining the feasibility of continued range use. Anecdotal evidence provided by one member of the task force was that prior to the range opening, there was a noticeably greater use of the reservoir by certain bird species; particularly bald eagles, osprey, and waterfowl. The assumption was that auditory impacts from the target range made it a less desirable area for the birds to forage or nest.

Impacts from auditory disturbance caused by target ranges is a far less extensively or conclusively studied aspect of range management in the scientific literature, though a number of phenomenological studies on different forms of noise impacts suggest that auditory disturbance may have a negative impact on some wildlife species, though none of these dealt with specific species that would be expected to be found on the Michaux. (See Appendix 4a-4c) Upon inspection of the site and review of the literature by Ecological Services section staff biologist, Aura Stauffer, a wildlife expert intimately familiar with Michaux fauna, she determined that the potential for such impacts from the existing target range would be extremely difficult to credibly substantiate or predict at this point. Therefore, there is no conclusive way to determine what additional level of consideration should be given to this issue.

Task force members disagree over how uncertain the impact the discharge of firearms has or could have on species associated with this area of the Michaux, or how much increase in negative interactions between humans and wildlife might occur due to target range activities at this site. But again, the task force is divided in terms of how to integrate such uncertainty into the decision making process. One view is that there should at least not be a determination to continue range use until sufficient study of the matter is performed to conclusively show it does not have a negative impact, at the very least, on raptor use of or ability to nest around the lake. The other view feels that at the most, it might be something to monitor and study should range use continue; but is not significant enough a known factor to be weighed as a feasibility factor of continued range use at the current site.

B. Recreational Conflict

The impacts the target range had on other recreational uses within the Michaux represented a second group of issues identified and agreed upon by the Task Force as important considerations in determining the feasibility of continued range use. All members of the task force acknowledged that current range use status and site location factors represented less than desirable conditions from a recreational management standpoint. But from that point, again, there was considerable divergence in terms of whether or not current conditions represented problems to mitigate, or reasons to close the range (at least at its current site) altogether.

In most cases, this divergence can be generalized by one perspective seeing such issues as inherent use conflicts generated specifically and uniquely either by the activity itself, or the difficulty of administering the activity given current range site limitations. The other perspective acknowledges the need for mitigation of the issue, but would simply identify needed mitigation as a cost factor to be considered in weighing the feasibility of continued range management at one site vs. another or against existing operational constraints. This second view does not see this issue as an intrinsic source of conflict or non-compatibility with other forms of recreation supported by the Michaux.

For this issue, where more detail on the specific divergence(s) among the task force is noteworthy, they are specifically identified. Otherwise, we simply list potential mitigating measures discussed by the task force members that would likely be considered necessary cost factors in any future decision to reopen the existing range. As such, they are always listed from no/least cost measures to high cost measures that could be considered to address or minimize the issue should continued range use at the site be deemed a feasible or desirable option by the Department.

In all cases there is acknowledged uncertainty by all members of the task force about whether or not such mitigating practices would achieve acceptable levels of recreational compatibility/conflict, let alone totally neutralize them. But the degree to which such uncertainty factors should be weighted in terms of the decision is the cause of resolute and widely divergent opinions among task force members at this point.

1) Noise

The sound of gunfire from the range is undoubtedly the most salient source of recreational conflict from the use of the current range site. Discharge reports from the range are easily audible to recreational visitors at nearby Long Pine Run Reservoir, a non-motorized lake popular among local hikers, fisherman, kayaking and canoeing enthusiasts, birders, photographers, and people seeking quiet respite. This poses a very real source of recreational conflict given user expectations of the area, particularly during otherwise tranquil times of the day (i.e. early morning.) All task force members agreed that noise impacts from range gunfire on lake visitors was a less than ideal aspect of the current range site, but differed on how they felt the issue should be approached in terms of determining the feasibility of ongoing use at this particular site.

One view stressed the uniqueness of the lake area within the Michaux as a recreational destination for large numbers of people seeking peace and tranquility and felt that at the very least; to continue to use the current site suggested a callous disregard for the unique recreational opportunity this particular lake provided the local population. This view stressed that if target range activities were to remain a part of the recreational offerings on DCNR lands, they should at least specifically be located proximal to other forms of recreational use already supported on DCNR lands that would be more compatible due to existing noise pollution, and to some extent, to the compatibility of the make-up of the proximal user groups. (Examples suggested would be somewhere in the vicinity of the ATV trail system, or along one of the more heavily traveled paved roads.)

The other view argues that the real question is what mitigating the noise issue to acceptable levels for most lake visitors would cost is the critical issue, as noise and other conflict mitigation measures would likely represent cost factors of relocating range activities anywhere in the Michaux. (For example, heavy equestrian use of the trails around the ATV system during winter months and the greater density of leased campsites and residential in holdings along paved roads within the forest could pose similar recreational conflict issues at other potential range sites) This group sees keeping the range at the current location as simply optimizing the public recreational values the area supports by utilizing a site heavily disturbed to construct the reservoir and stress that many lake visitors also visit the target range before or after canoeing, kayaking, fishing, or hiking around the lake. They are also likely to point out that while the target range is undoubtedly a high impact activity, the general intensity of recreational use and road access in the area makes it one where a target range may actually have fewer noise impacts than if sited in a less disturbed or fragmented forested area within the Michaux.

At this point, there is uncertainty about what level of recreational conflict the range poses to state forest users or Long Pine Run Reservoir users specifically. The only information the Task Force gathered in assessing this issue is anecdotal or qualitative. It is an area where uncertainty could probably be significantly reduced through empirical social survey methods should that be considered an aid to making and sustaining the decision.

Potential Mitigating Factors

- Restricted use hours/days to segment Range/Lake use time frames
- Caliber restrictions (or more targeted/strategic enforcement efforts on existing restrictions)
- Revegetation upslope of backstop
- Overhead baffles on shooting stations
- Shoot through mufflers
- Surround Berm to absorb and deflect sound waves straight up

2) Increased Traffic/Road Congestion

Parking for the current range is provided at two, small pull off areas along Birch Run Road adjacent to the range. Heavy use periods at the range significantly increase the amount of traffic on Milesburn and Birch Run Roads, and overflow parking of range users along Birch Run Road can at times constrict passage of other vehicles and create dangerous roadway conditions and/or user conflicts.

Potential Mitigating Factors

- Better road way signage (Cautionary signs to denote potential congestion area, and Parking area signs)
- Additional or enlarged parking areas near the range
- On-line Range Registration system to avoid user pile-up

3) Littering/Vandalism

Littering and vandalism is a major problem everywhere on the Michaux, but there are certain locations that seem to attract a higher degree of this type of illegal behavior, and the target range is definitely one of them. Primary forms of vandalism include shooting signs, trash cans, or other forms of site infrastructure, while littering ranges from the intentional dumping of garbage on the site, to not retrieving targets, spent brass, or soda, water bottles, or other trash or belongings brought onto the site.

Potential Mitigating Factors

- Improve effectiveness of site signage; including notification of penalties for targeted violations (littering, vandalism, misuse of firearms citation costs + loss of privileges, with Criminal Trespass a possibility for repeat offenders)
- Volunteer Group Clean Up and Assistance in Coordinated User Group Self-policing efforts
- Strategic Law-enforcement deployment/surveillance agreements with partnering agencies (PGC, PFBC, State Police)
- Fence and Lock Site During Range Closure Hours

4) Public Safety

Public safety is always a critical concern given the realities of target range conditions. Though the topographical context of the current range provides some advantages from a public safety standpoint, it also provides a number of distinct challenges, not the least is intensity of other forest use in the surrounding area (numerous trails and the nearby lake). Because of its location in the mouth of a hollow, it is also difficult for law enforcement patrolling the site to visually assess on-site activities prior to engaging site occupants, which represents both a public and an officer safety concern.

Potential Mitigating Factors

- Identification of Target Range Area on Public Use and other maps as well as a notification board at the lake parking area showing the Target Range location
- Better signage along trails alerting hikers to Target Range Location
- Create some areas where law-enforcement can visually appraise site activities before engaging range visitors. (Preferably from or as close to their vehicle as possible)
- “Blue Sky” Reduction strategies at shooting stations (See overhead sound baffle and shoot through tubes under noise mitigation, as the two engineering solutions are similar)
- Fence and Post Site with Appropriate signage to avoid unintentional walk-ons

C. Budget Constraints and Prioritization/Expenditure of Public Funds

Most Task Force discussions about target range issues eventually came around to questions of cost and resource allocation, and they often stopped there. So at this point, while probably not the most salient public issue associated with target range management, it is the one where DCNR executive staff may need to invest the greatest level of thought and guidance in order to assist district managers in adequately assessing and articulating the feasibility of continuing range operations on the Michaux from a resource allocation perspective. Part of the reason for the difficulty of this issue is that past target range activities within the District have always simply been sustained out of the District's annual operating budget and were largely paid for through the use of existing staff resources and materials (for example, maintenance crews provided labor; and materials, such as timbers for the backstops, were simply produced at low out-of-pocket cost levels from the surrounding forest).

Since the District's budget allocation formula is largely built around variables such as acres of land, annual timber harvest goals, miles of maintained state forest roads, and the number of maintenance divisions and administrative infrastructure within the district, it is difficult to show how funds or staff resources to set up or manage the target range were appropriated in the past from among other competing projects the district could have supported during the same time-frame. The inability to provide this type of accounting allows for the impression that supporting target range activities is being prioritized over other, potentially more fundamental aspects of district operations as reflected by its annual operating budget (i.e. grading roads, maintaining trails, etc).

Past allocation decisions also make it difficult to show how the district (or DCNR) is credibly assessing and prioritizing (again, among other existing needs to be covered by its annual operating budget) resources to cover not only immediate cost factors associated with responsible target range management (i.e. ensuring ranger coverage, putting up signs, cleaning up litter, etc.) but also responsibly planning for the operational necessity to cover periodic or long-term mitigation and management costs that will predictably occur should target range activities continue on the Michaux (such as additional future site characterization studies to monitor scatter zone impacts, or to mitigate issues associated with range use should scatter zone impacts become evident.)

Given the reality of how past resource allocation decisions were made, and uncertainties about how they can or will be made in the future, it has been difficult for the district management team to adequately guide the Task Force members in how either the District or DCNR integrates the many different cost and resource prioritization questions raised by other issues identified. There is general consensus among the Task Force that until uncertainties around funding and resource prioritization levels are clarified, their own opinions about the continued feasibility of

target range activities (at least somewhere – one Task Force member is resolutely opposed to the idea of continued use of the current site) on the Michaux are still largely unformed.

Finally, there is a general divergence among task force members on whether or not providing public target range activities is firmly aligned with DCNR's mandate and mission. That, along with the underlying fundamental uncertainty identified in the Problem Statement, gives rise to different perspectives and opinions among the Task Force on what cost factors or uncertainties about cost factors are most critical to determining the feasibility of different decision alternatives. Those differences are described where possible in the following subsections.

1) Availability of Resources to Support Target Range Decisions

Any decision made about the future of target range activities on the Michaux will come with real and measurable as well as uncertain, or immeasurable cost factors attached. The most basic issue raised by numerous Task Force discussions is: Does DCNR/ Michaux State Forest have the financial and staff resources to sustainably and responsibly provide for the management of target range activities at the district level without inherently compromising other aspects of its operations? Currently, the answer to that question is uncertain at the district level (and perhaps Bureau and department level as well). In fact, even the costs incurred in deciding to close and retire the existing range would likely require approval from Harrisburg, let alone the much higher upfront costs that would be incurred by trying to mitigate existing issues in order to continue providing target range opportunities.

That uncertainty also polarized the perspectives of Task Force members. One side stressed the opportunities to leverage the formation of a coordinated volunteer group to reduce the cost burden of range management (and the district office has received numerous offers from range users to contribute labor and in-kind services to support continued target range activities) and to even perhaps assist with grant writing and fundraising from outside funding sources willing to invest in providing public target range opportunities. The other perspective felt that without internally designated support and funding streams controllable by DCNR, such funding mechanisms ran the risk of simply increasing the control of range management decisions by the user group most interested in its continued provision on public lands.

Other differences that emerged during discussions about funding uncertainties that are informative in terms of what future types of analysis will be needed to arrive at and implement a sustainable solution included differences in opinion on the part of Task Force members as to how or why the higher cost of a relocation option might be considered a more feasible option for DCNR to pursue.

One side felt that if reopening the current range with adaptive management strategies in place to mitigate existing range issues proved successful, in time, it might be more advantageous to relocate the activity to a different, potentially more ideal site where it could be more cost effectively or compatibly sustained alongside other forest uses. However, this view felt that incurring those higher upfront costs of relocation without first showing an improved trajectory of range management indicators at the existing site risked simply moving existing range problems to a new location with a higher price tag.

The other view holds that site constraints at the current location make sinking any additional public funds into sustaining target range activities there infeasible, and that if Michaux managers and/or DCNR do decide to prioritize continued provision of target range opportunities on the forest, it should first identify a more ideal and cost effective site for this activity to take place on the forest.

Clearly, the differing values placed by members of the Task Force on relocation options are largely being informed by the relative value placed on continued provision of public target range opportunities while adaptive management solutions for range activities evolve. As outlined in the problem statement, given the fundamental uncertainty about whether or not the public target range limits or mitigates undesirable target shooting activities, it is impossible to quantify or measure this value from an objective perspective. This makes it difficult to evaluate tradeoffs between the costs or benefits of the upfront costs associated with any decision outcome at this point, let alone the much more expensive and uncertain relocation options.

2) District Capacity to Sustain Rate of Use (and Misuse) of Target Range Infrastructure

While most of the existing infrastructure at the current target range site was extremely low-cost, cost factors associated with maintaining it have been higher than expected due to high levels of use. The highest cost factor is replacing the timbers used as backstops for the target areas; which have to be replaced multiple times a year when the range is in operation. Approximate costs for this task are about \$500 for materials and \$1,200 for labor. Understandings from the Site Characterization study suggest this current problem is compounded by the additional need to mitigate current lead levels at the high deposition points on the site, as well as to have a budgeting plan in place to cover future periodic needs to monitor and mitigate lead levels around the target areas.

There seems little doubt that investment in engineered range solutions with higher upfront price tags than those employed in the past could probably yield lower short and long-term operating costs by reducing use-rate depreciation and lead mitigation needs on the site. But whether such investments would be able to reduce operational costs to levels that could be considered “sustainable” given

existing district budget constraints and the inability to fully predict or restrict usage rates at the range is unquantified and uncertain.

3) Administering/Managing Range Access

Given the popularity of the Michaux target range, a final cost/constraint issue raised by the task force was what available options DCNR would consider to administer/control access to the range or otherwise reduce the management burden the range represents through leasing/partnership/or M.O.U's with other agencies or legal entities. Current Bureau of Forestry guidelines are non-prescriptive regarding all of these issues, and therefore, issues such as these raised by the task force represent legal or policy level considerations that cannot be addressed at the district level, and may require sustained engagement by DCNR decision makers to resolve.

As just one example of the range of potential issues within this category: The district's past practice of handing out range permits represented a very real administrative cost of range management, but dubious benefits in terms of data, information flows, or control points with which to measure or manage range activities. Recognizing the inadequacy of this approach, Task Force members and other stakeholders numerous times have suggested the idea of requiring a current PA Hunting license as the sole stipulation for range use, which seems to represent a number of potential advantages over the current permit system employed by the district:

- It could be used with no cost to the District.
- It comes already attached with personal ID information (important for law enforcement)
- It irrefutably identifies the target range user as a critical recreational stakeholder on state forests (as opposed to shooting sports enthusiasts generally; a fine point but potentially with some political significance given the range of stakeholder perspectives DCNR needs to remain responsive to.)
- It identifies a person who has recently invested personal funds to support the work of a partnering conservation agency whose wildlife conservation officers and biologists aid and support DCNR land managers in many critical ways, including providing additional law enforcement presence at the target range, and is therefore somewhat deserving of expecting some return on that investment from that and other public agencies)
- It can be revoked should a target range violation occur (I think . . . might have to check with PGC on this one), and with that revocation comes a loss of privileges beyond the simple loss of Michaux target range access.
- Depending on the level of partnership achieved with PGC on this issue, it may provide an efficient way to draw sample sets of potential range users through the PGC's PALS system should it be desirable to survey potential Michaux range users.

At this point, the potential of integrating this or other potential considerations into the determination of whether or not target range activities are a feasible option for the Michaux in the future similarly depend on the engagement and direction of DCNR (and potentially PGC) decision makers.

II. Decision Making Objectives and Alternatives

Four objectives have been identified through Task Force discussions that are critical in evaluating the feasibility of continued target range activities on the Michaux. These four objectives, simply stated, are Cost, Environmental Impact, Recreational Compatibility, and Public Availability. A final effort by the Task Force to date was to use an analytical tool known as a Consequence Table (provided by USGS Cooperative Research Unit) to introduce an objective decision making framework for articulating the values and assumptions at work within this decision making context. At this point, all analysis done by the Task Force has been based on subjective estimates or reasonable assumptions rather than on quantitative data. Because of this, the intent on the part of the Task Force in using this decision making framework is not to be construed as an argument for any potential decision outcome at this point, but simply to assist DCNR and its stakeholders in talking as transparently and objectively as possible about the values, uncertainties, and assumptions being held about the feasibility of future Target Range activities on the Michaux. This decision making tool supports a number of different analytical functions that may prove useful to both decision makers and stakeholders as we move forward.

A. Objective Weighting

The Consequence Table makes it easy to show the impact on decision outcomes should it be considered desirable to increase the relative weight of one or more of the objectives (i.e. make it “matter more” than the other objectives in terms of determining which alternative is most desirable). For instance, during Task Force discussions, there was general consensus that in this decision making context, Cost and Environmental Impact should be given more weight than Recreational Compatibility and Public Availability, since they were both much more “constraining” in terms of being able to ecologically and economically sustain target range operations. So as an early effort in utilizing this tool to demonstrate the current subjective values Task Force members placed on the four objectives, we could model decision alternatives based on a relative weight of 8, 9, 7 and 6 for Cost, Environmental Impact, Recreational Compatibility, and Public Availability objectives, respectively.

B. Optimization Across Objectives

In using the Consequence Table, all objectives are given a directionality; in other words, each objective is either to be minimized (i.e. Cost, Environmental Impact) or maximized (i.e. Recreational Compatibility, Public Availability). Therefore, the tool provides an easy way to objectively model which alternative is considered “optimal” under different sets of assumptions.

C. Ranking Alternatives Based on Subjective or Quantitative Measures

A final value of utilizing this decision making tool is that it provides an easy way to model decision outcomes based on either subjective or estimated values in order to clarify critical areas of uncertainty that may need to be resolved in order to arrive at a truly optimal alternative. As such, it provides an important foundation from which to develop an adaptive management framework and strategies to support decision outcomes over time. At this point, Task Force efforts at using the tool to model potential alternatives involved using a constructed scale (1-10) to assign perceived (or “guesstimated”) performance values; but more quantitative values or indicators could be used in future analyses as they become available.

The following summarizes some potentially important understandings of how stakeholder stated objectives and likely assumptions interact with critical areas of uncertainty within this particular decision making context. DCNR policy makers should be attuned to these factors as they engage with and provide guidance to the District on this issue.

D. Cost

Given the high degree of concern over the expenditure of public funds the Task Force agreed it was important to carefully evaluate the costs of each alternative. The directionality for this objective would be to minimize; therefore, all things being equal in terms of performance on other objectives, the least cost factor would always win. However, attempting to integrate cost considerations quickly raised critical questions about which type of costs or uncertainties about costs DCNR will (or should) consider or weigh most heavily in determining the feasibility of providing or not providing target range activities on the Michaux in the future.

- 1) **EXAMPLE:** The decision to discontinue target range operations would incur at least three identifiable types of costs to implement:
 - a. The cost of mitigating the known contaminant levels identified by the Site Characterization study as well as some costs incurred in terms of both retiring the site, and disposing of existing infrastructure.

- b. It would also predictably incur, at least in the short-term, additional costs that would be less able to be precisely predicted given numerous uncertainty factors. For example, the need for continued ranger and staff time investments to mitigate current habituated use (and misuse) at the existing target range site, or efforts to successfully regenerate the site with native plant communities.
- c. It should also incur any costs associated with either mitigating or managing the effects of illegal or irresponsible target activities on (or even off) the Michaux that would have been prevented by options that kept the range open.

The first is a known cost that can be precisely predicted and quantified before the decision is made. The second cost factors are costs that can be known, but are less able to be precisely estimated due to uncertainty factors (though they could still probably be estimated relatively closely). The third type of cost factor closely resembles what economists might call an externalized cost (i.e. a cost that doesn't necessarily show up on the current balance sheet because it is either not necessary, desirable, or possible to quantify, but that may (or quite likely) ends up as a cost factor somewhere in the world as a result of the decision under analysis).

2) EXAMPLE: By way of contrast, a decision to continue providing target range activities on the Michaux, say (for simplicity's sake) at the existing range site; would necessarily incur a much wider range of readily predictable and much higher upfront costs. For instance it would need to incur the cost to:

- a. Mitigate existing lead levels and invest ranger and staff time presence at the site, implement noise reduction strategies, improve signage, improve backstop/berm technologies, conduct periodic lead monitoring and mitigation and no doubt a number of other costs associated with target range best management practices that are predictable and relatively easy to quantify.
- b. It further incurs the easy to identify, but much longer-term and more difficult to predict and quantify costs that will need to be addressed should lead problems begin to show up in the scatter zone of the range, or some other unforeseen consequences of the activity that might severely negatively impact the agency or public as a direct result of implementing this decision.

- c. Finally, given the long-term nature of the commitment that implementing this decision would entail other costs or missed opportunities incurred by the decision due to the investment of time and resources into this project rather than other potential projects should also be considered as cost factors.

In this case, the first cost factors associated with this decision are very similar to the first *two* cost factors associated with the first example. The second set of cost factors is different, and could be described as a liability or risk factor associated with the decision (which would represent as a cost in strict accounting terms). And the final cost factor associated with this decision represents either a deferred maintenance or an opportunity cost. Therefore, different decision alternatives incur very different types of costs, making it difficult to do simple but realistic comparisons between alternatives based on this objective.

To simplify the complexity of applying this objective to the four alternatives, Task Force rankings were limited to costs that were relatively easily identified, predicted, and estimated in the short term. However, this is a critical simplifying assumption that must be clearly articulated, and the ramifications of it understood within this decision making context.

E. Environmental Impact

The directionality for this objective was to minimize environmental impact. Obviously, given the agency's mission and mandate and the unique values that state forest lands have as living, biological systems; and given the proximity of the existing range to a potable water supply, the importance of carefully and credibly weighing the impact of the decision against this objective cannot be overstated. That said, the fundamental uncertainty described in the problem statement also makes this objective the most difficult one to credibly quantify. Negative environmental impacts or risks of impacts of a public range (particularly at the current location) are much easier to measure than the negative environmental impacts of moving the range to a yet undetermined location; let alone not providing a public range at all, or for an undetermined period of time. .

Given the expense and difficulty of resolving this uncertainty in an effort to either better clarify alternative rankings, or monitor decision outcomes, it is unlikely that more precise or empirical evidence will add greater clarity in evaluating among alternatives based on this objective. Recognizing the critical importance of this fundamental uncertainty within this decision making context cannot be overstated, as it will be critical to both justify and monitor any decision outcome on the basis of a political calculus of what is considered the most acceptable form of environmental impact or uncertainty.

F. Recreational Compatibility

The third objective identified and agreed upon by Task Force members was recreational compatibility. It was clearly understood that if an alternative was more compatible with other recreational uses and user groups on the Michaux, it should rank more highly than alternatives that created or exacerbated user conflicts. (Directionality is to maximize).

While at this point, determining the performance of each alternative according to this objective without empirical data to assess it by would likely be extremely contentious, it is one that could be assessed through focus groups or other survey methods in order to either further clarify the value of each alternative, or to monitor decision outcomes.

G. Public Availability

The final objective identified was public availability. The Task Force felt it was important to include this objective to ensure that decision outcomes reflected the value that, all other things being equal, the decision that maximized public access to and use of the state forest system would be considered the most desirable outcome.

Again, assessing the relative value of different alternatives based on this objective could be quantified through focus group and/or social survey methodologies, should that be desirable in terms of either further justifying or monitoring decision alternatives.

H. Alternative Decision Outcomes Developed

A final effort taken by the Task Force to date was to identify four potential alternatives for the target range decision that they felt would best address the critical issues posed by the current range and that could be evaluated against the objectives discussed above. Task force members drafted brief perspectives and/or gathered and organized information on mitigating strategies they felt represented the most desirable decision outcomes from their perspective. Those perspectives are integrated in the following descriptions as much as possible, while the individual reports submitted by Task Force members are attached as Appendix D. For each alternative, a brief description is provided, followed by a short discussion of strengths and weaknesses of each option in terms of its ability to meet our stated objectives.

III. Options

Option A: Discontinue Target Range Activities

The first decision alternative considered was to retire the existing range and discontinue providing public target range activities on the Michaux based on one or more of the following arguments:

- 1) Target range activities are not compatible with state forest management (i.e. not a “low density, dispersed form of outdoor recreation; and/or intrinsically in conflict with such forms of recreation)
- 2) More optimally provided through other venues (i.e. local Rod and Gun or Hunt Clubs surrounding the Michaux) given the opportunity costs it represents for district management attention and resources.
- 3) Unable, given funding and resource constraints, to be responsibly and sustainably supported by DCNR/Michaux district managers given high costs of mitigating impacts.

Strengths:

- Simplifies demands on district resources
- Minimizes significant source of recreational conflict (Noise pollution/traffic congestion) on the Michaux
- Minimizes long-term public liabilities incurred by prolonged range use
- Could encourage greater local participation/support for local Rod and Gun/Hunt Clubs

Weaknesses:

- Eliminates a popular recreational opportunity on the Michaux
- Potentially damaging to public relations with hunters, a key recreational group on the Michaux given both the economic activity and ecological services (i.e. DMAP, conservation volunteer efforts in habitat management, etc.) generated through hunting and hunter participation in state forest management.
- Potential increase in illegal target range activity on the Michaux or surrounding landscape.

Option B: Mitigate and Re-open existing Range

The second option is based on the argument that while there are admitted limitations with the existing site as a target range, the sustainability (or feasibility) of continued public target range opportunities on the Michaux is far more dependent on establishing and achieving measurable indicators of acceptable range-use standards that demonstrate the activity can be supported along with other forest uses within the districts operational capacity. Under this option, if these standards cannot be met at the existing location given user group support and volunteer effort, it is unlikely that provision of this activity represents a sustainable part of the districts recreational offerings and should be discontinued.

This option would entail making some public investment to mitigate the impact of continued target range activities at the site to levels that are acceptable and compatible with other recreational uses, and also establish clearly measurable indicators for when additional volunteer efforts or in-kind services would be needed to address range maintenance, upkeep, or monitoring issues. Should insufficient support be provided through user group volunteer efforts to consistently keep the range above acceptable levels for an agreed upon amount of time, it would be discontinued.

Strengths:

- Minimal additional time-lapse in provision of a popular public recreational activity on the Michaux
- Sustains target range activity on an already highly impacted site on the Michaux
- Provides this activity in an area already drawing heavy recreational usage
- Sustain positive relations with hunters, an important recreational user of the Michaux
- Prioritizes short-term investment in adaptive management strategies and puts onus for sustainability of continued provision of target range opportunities on user group
- Reduces time-line uncertainty by engaging with known issues on an existing site

Weaknesses:

- Acceptance of potential long-term risk/cost factors inherent in existing site limitations (contaminant monitoring/mitigation, enforcement/officer safety, recreational compatibility)
- Sinking additional public funds into sustaining/mitigating target range activity on sub-optimal site
- Reduces positive relations with user groups or individuals who perceive the current range site as incompatible to their recreational pursuits in the vicinity.
- Potential difficulty ensuring range standards are met and/or range closure remains a politically feasible option if they are not met
- High level of engagement (especially short-term) on the part of Michaux management staff
- Potential competition with local Rod and Gun/Hunt Clubs in need of membership.
- Time-constrained decision making and intense short-term engagement by district management staff

Option C: Relocate Range Activities to a Better Location.

The third option is based on the argument that any continued use of the current range site represents an untenable or irresponsible outcome due to conflicts and limitations associated with any continued use of the site as a target range. (i.e. environmental risks, recreational conflicts, officer safety/enforcement, etc.) Therefore, investing any future money or management effort into mitigating factors at the current site are ill-advised, and any efforts to continue supporting a public target range opportunity on the Michaux should be invested towards relocating this activity to a more optimal and sustainable location.

Strengths:

- Reduces noise pollution and traffic congestion in the vicinity of Long Pine Run Reservoir
- Current site poses real limitations as a target range, for both users and managers alike.
- Provides time for more deliberate/studied public investment towards supporting long-term target range opportunities on the Michaux

Weaknesses:

- Delays provision of a popular recreational activity on the Michaux
- Risks investing high levels of public investment into “site specific” solutions prior to addressing potentially lower cost management solutions
- Increases time-line uncertainty for both stakeholders and managers
- Increases both short and long-term cost of engagement for Michaux managers.
- Would require construction of a new range site with attending environmental impacts at a new location

Option D: Mitigate, Reopen, and Relocate

This option is based on the argument that continual provision of a public target range option on the Michaux is critical to the public interest and should be sustained as part of the recreational activities on the Michaux in the short and long-term in the most responsible and sustainable manner possible. This option would essentially begin with and include all of the measures in Option C, with the caveat that if renewed range operations under the new management standards and user group agreements proved successful for a given period of time (say, three years, for example), the range would be relocated to a more optimal location in terms of minimizing potential long-term public liability while maximizing user satisfaction (i.e. everything under Option B).

Strengths:

- Minimized time-lapse in provision of a popular recreational activity on the Michaux
- Sustains target range activity on an already highly impacted site on the Michaux while long-term solutions to site limitations are found.
- Provides this activity in the short-term on an area already drawing heavy recreational usage while a more optimal long-term location is found where it would sustain fewer recreational conflicts
- Sustain positive relations with hunters, an important recreational user of the Michaux
- Prioritizes short-term investment in adaptive management strategies and puts onus for sustainability of continued provision of target range opportunities on user group
- Reduces short and long-term uncertainty by addressing known issues on an existing site while providing for long-term sustainability
- Provides time for more deliberate/studied public investment towards supporting long-term target range opportunities on the Michaux

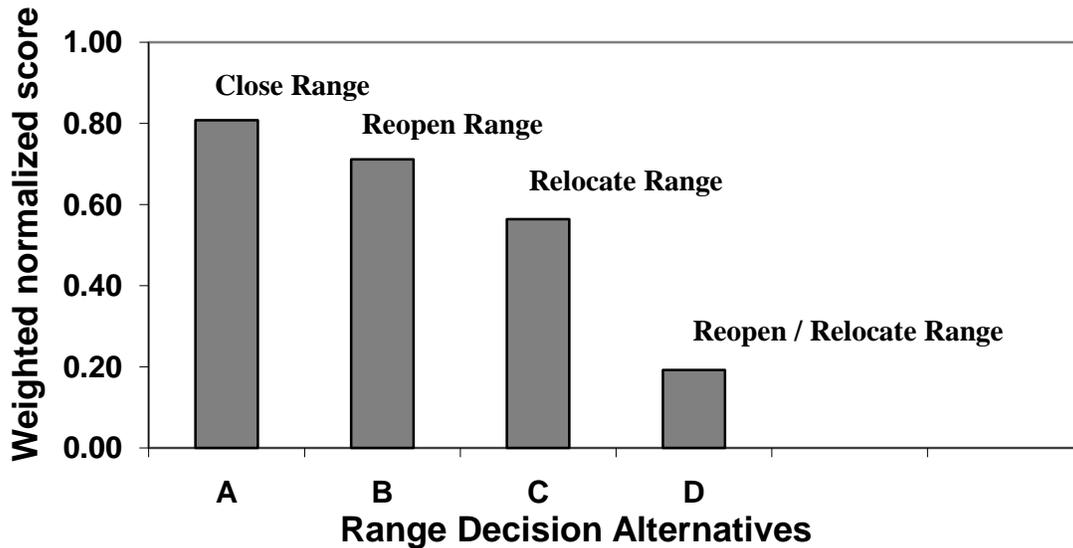
Weaknesses:

- Highest short-term and long-term engagement by Michaux management staff in just one of many pressing recreational use issues
- High public investment in provision of just one type of recreational opportunity supported by the Michaux
- Highest degree of site-level (i.e. surface area) environmental impact due to target range activity
- Potential competition with local Rod and Gun/Hunt Clubs in need of membership.

IV. Summary

Example Ranking of Alternatives

Based on Task Force discussions about the weights given to the four objectives; and using a constructed scale of 1-10 to give each alternative a performance rating based on how well it satisfied each objective relative to the other options, the Consequence Table provides the following ranking of alternatives:



Obviously, given the relatively high weight given to costs and environmental impacts, and the simplifying assumptions given the complexity and uncertainty inherent in those two objectives, the decision to close the range appears to be the most feasible based on this subjective exercise. However, further input is needed from both DCNR policy makers, local public officials, and Michaux stakeholders to make a final determination among the potential decision outcomes. It is the hope of the Michaux District management team and the other members of the Task Force that the work we have done together will help to support a constructive and informed dialogue about the feasibility of continued target range activities on the Michaux.

Appendix 1

TARGET SHOOTING IMPLEMENTATION GUIDELINES

STATE FOREST RULES & REGULATIONS

CHAPTER 21. § 21.65. Target Shooting

This Section of the State Forest Rules & Regulations prohibits target shooting “...except where authorized by the District Forester or a designee.”

Safety of the public, the shooter, and State Forest employees is the Bureau’s prime concern.

These guidelines are intended to provide direction for consistent interpretation and implementation of this Section among the twenty Forest Districts until further direction is provided.

Acceptable Weapons are limited to:

1. devices operated by air, chemical, or gas cylinder, such as pellet and BB guns, excluding paint-ball guns;
2. bows and arrows, blow guns or sling-shots;
3. crossbows if the individual possesses the PA Game Commission special permit to hunt with one;
4. firearms or other weapons allowed for hunting by the PA Game and Wildlife Code.

Unless a waiver is granted by the Division of Operations and Recreation, the following Site Standards must be met for any approval of a target location:

1. the shooting position and target must be at least 450 feet from any buildings unless the location is a leased campsite, in which case the shooting position and target must be at least 450 feet from any buildings not part of the lease.
2. the projectile’s path from the shooting location to the target must not cross a road, an established trail, or waterway;
3. the ground surface at no more than 45 feet behind the target must be higher than the target to act as a backstop;
4. the view from the shooting position to the target, 100 feet either side of the target and at least 300 feet behind the target (unless obstructed by the ground surface), must be sufficiently open to allow users to observe anyone entering the shooting area.

Target Specifications must comply with the following:

1. targets must not be mounted on trees
2. targets must not be mounted more than 60 inches above the ground;
3. all targets must be stationary.

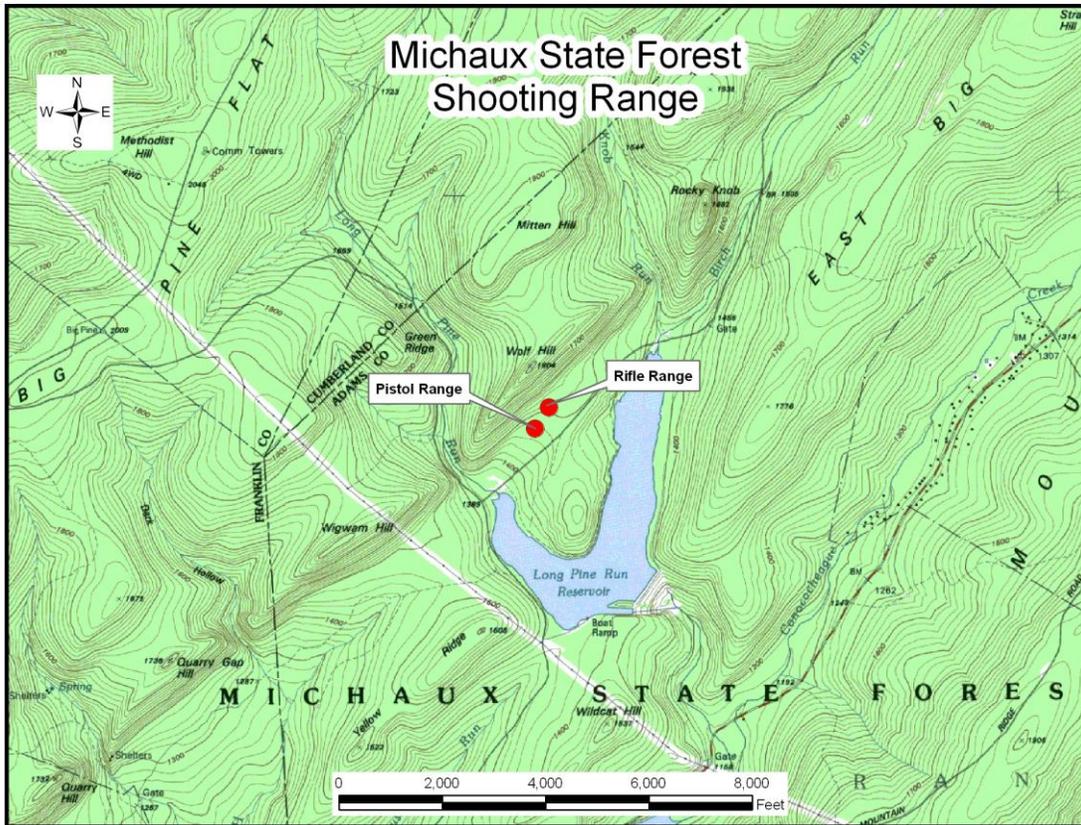
The following **Restrictions** are **Conditions** of any permission given:

1. any shooter utilizing the site must meet all legal requirements for the weapon they are using.
2. any shooter utilizing the site must not be under-the-influence as defined by the PA Motor Vehicle Code;
3. the use of alcohol and/or drugs is prohibited during any shooting session;
4. shooting hours are the same as defined for daytime hunting in the PA Game & Wildlife Code.
5. other reasonable restrictions may be included.

A **responsible party** must be identified for each target site that is permitted. The standard "Release and Indemnification" form must be completed and signed by the District Forester or designee and the responsible party.

Violation of any of the restrictions and/or specifications listed above, or the use of shooting practices or conditions normally considered unsafe by the Community of users of the weapon in use, as determined by the District Forester or designated representative, will result in withdrawal of permission for a target-shooting site.

Appendix 2



Appendix 3

REQUEST FOR PROPOSALS

Target Range Baseline and Site Characterization Study

November 17, 2010

Commonwealth of Pennsylvania
Department of Conservation and Natural Resources
Bureau of Forestry
Michaux State Forest
Franklin Township, Adams County

Prepared by
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Background:

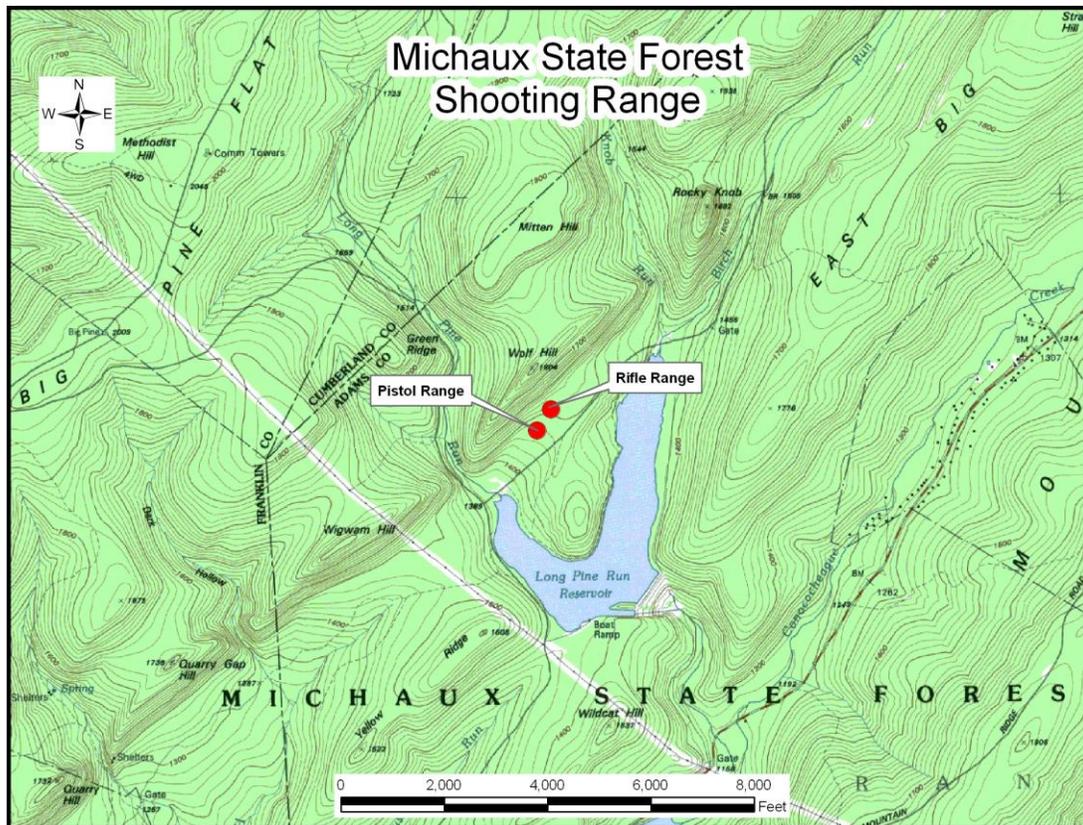
Hunting is an important recreational activity on the Michaux State Forest. As a service to local hunters, in 2004 Michaux managers established a public target range off of Birch Run Road in the vicinity of Long Pine Run Reservoir in an area that was highly disturbed during reservoir construction. Long Pine Run Reservoir serves as the potable water supply for nearby Chambersburg, and is also a scenic, non-motorized lake highly valued by other recreational user groups.

There are currently over three thousand permitted users of this range. Managers, range users, recreational stakeholders, and local elected public representatives alike recognize the need for improved planning and management of the site in order to ensure its use as a target range remains compatible with other management objectives of the public forest resource and sustainable given resource constraints. One of the most critical potential conflicts with continued use of the site as a target range include potential impacts of lead

and other contaminants to the reservoir and costs associated with monitoring, mitigating, and managing the range alongside other state forest uses. Developing objective baseline measures of existing environmental impacts to the site from its use as a target range are critical to maintaining constructive dialogue among stakeholders and making credible management decisions about the feasibility of future use of this or other sites within the Michaux to support target range activities.

Site Description

The site is located in Franklin Township, Adams County, PA, within the Michaux State Forest. It consists of both a pistol and a rifle range and is approximately 8 acres in size. The project area is situated along Birch Run Road approximately 0.3 miles north of the intersection with Milesburn Road. The site can be located on the Caledonia Park, Pennsylvania, United States Geological Survey (USGS) 7.5 Quadrangle Map (Figure 1).



Purpose of work:

To provide objective, quantitative baseline understandings of environmental impacts and potential impacts of target range use at the site in order to support further inquiry into the feasibility of future site use under different management and mitigation options.

Tasks:

Contracted studies will include:

- Delineation and mapping of scatter zones for both ranges (Documented by GPS coordinates at sub-meter accuracy levels).
- Soil sampling to identify contaminants, contaminant levels in high impact areas (in front of benches, in and around backstops, and throughout the scatter zones), and leachability of contaminants.
- Groundwater sampling to determine depth to groundwater and adverse groundwater impacts.
- Determine the area of offsite migration of contaminants in drainage areas and down gradient, both in soil and groundwater.
- Characterization of site wetlands to determine if they are natural wetland soils or a result of construction disturbance.

Scope of work:

The target range consists of both a pistol and a rifle range. Work described above will be performed on both ranges.

Use of Study Results

The range is currently closed and may stay closed dependant on study findings. Study results will be used in collaboration with DCNR, DEP, and state forest stakeholders to determine the feasibility of future use of this site as a target range. Should continued use prove to be a desirable option, it will also provide baseline conditions from which to constructively discuss goals, management options, and criteria and indicators to be used to ensure future range use remains compatible with other state forest management objectives.

Pre-bid: Site walkthrough to occur January 4, 2011 10-12am (Rain/snow date of January 6, 10-12). Attendance at this walk through is mandatory for bids to be considered. Please RSVP to attend the walkthrough to Michaux State Forest District Office by C.O.B (4pm) January 3.

Study proposal and quote:

- A study proposal describing methods and sampling designs to be used for each task involved in the project with associated cost schedule. Reviewed by Task Force members, technical advisors, and DEP personnel for approval prior to awarding the project. **Due 2/1/2011.** Project will be awarded by **2/14/2011.**

Deliverables / Post-project award:

- Collection and analysis of raw field data as described by study proposal.
- A written report, **due 5/20/2011**, including but not limited to:
 - A narrative outlining critical study findings relevant to the desired uses of study results
 - Map(s) showing ranges and scatter zones
 - Contaminant isoconcentration maps
 - Groundwater and surface water flow maps
 - All analytical data from a DEP certified laboratory
 - Tabulated analytical data
- Involvement/presentation at up to three stakeholder meetings during 2011 on study results with DCNR managers and stakeholder representatives.

Appendix 4a

NPC Noise Pollution Clearinghouse

“Good neighbors keep their noise to themselves.”

Noise Pollution Clearinghouse FACT SHEET Noise Effects on Wildlife

Sources of noise that have the potential to effect wildlife include aircraft overflights, recreational activities such as snowmobiling and motorboating, automobile traffic, and heavy machinery and equipment. The effects of aircraft noise have been studied more intensively because of their threat to wildlife populations in national and state refuges and parks. Impacts to wildlife habitat in remote areas have increased from military aircraft overflights and helicopter activity related to the tourism and resource extraction industries (National Park Service, 1994).

The study of animal response to noise is a function of many variables including characteristics of the noise and duration, life history characteristics of the species, habitat type, season and current activity of the animal, sex and age, previous exposure and whether other physical stressors (e.g. drought) are present (Manci, et al., 1988).

Physiological responses: Disturbances from aircraft noise range from mild, such as an increase in heart rate to more damaging effects on metabolism and hormone balance. Long term exposure to noise can cause excessive stimulation to the nervous system and chronic stress that is harmful to the health of wildlife species and their reproductive fitness (Fletcher, 1980; 1990).

Behavioral responses: Responses vary among species of animals and birds and among individuals of a particular species. Variations in response may be due to temperament, sex, age, and prior experience with noise. Minor responses include head-raising and body-shifting. More disturbed mammals will trot short distances; birds may walk around flapping wings. Panic and escape behavior results from more severe disturbances (National Park Service, 1994).

Behavioral and physiological responses have the potential to cause injury, energy loss (from movement away from noise source), decrease in food intake, habitat avoidance and abandonment, and reproductive losses (National Park Service, 1994). Studies have shown that when certain bird species are flushed from nests in response to noise, eggs are broken and young are exposed to injury and predators (Bunnell et al., 1981; Gladwin, 1987). Young mammals have been trampled as adults attempt to flee from aircraft (Miller and Broughton, 1974). Another study compared mortality rates of caribou calves exposed to overflights to those not exposed (Harrington and Veitch, 1992). Mortality rates were significantly greater in the exposed group. Milk release may have been inhibited in mothers disturbed by the noise leaving calves malnourished.

Animals rely on hearing to avoid predators, obtain food, and communicate. Auditory systems of some animals are particularly at risk to physical damage from chronic noise, for example desert animals that have evolved an acute sense of hearing. Studies have documented hearing loss caused from motorcycle noise in the desert iguana (Bondello, 1976) and the kangaroo rat, an endangered species (Bondello and Brattstrom, 1979).

Ninety-eight species of birds and mammals on national park lands have been identified as threatened or endangered. The impacts on these species from aircraft noise are largely undocumented. Some of the species became threatened or endangered because of loss of habitat. Further relocation necessary because of noise disturbance might not be possible for these species (National Park Service, 1994).

Studies are needed to determine the long term effects of noise disturbance. Long-term studies have been difficult because of the effort required and the complexity of the variables affecting animal survivorship (National Park Service, 1994).

Appendix 4b



News/Issues *Wildlands Issues*

WILDLANDS MENU

- ▶ Wildlands News Archive
- Topics**
- ▶ Soundscape as a Protected Resource
- ▶ Motorized Vehicle Management
- ▶ Biological Effects of Noise on Wildlife
- ▶ Energy Development

The Biological Effects of Noise on Wildlife

Research on this topic has taken place for years, quite a bit below the surface of public awareness. Bernie Krause has written about several striking examples; here are some excerpts (see full essay linked below).

"Many types of frogs and insects vocalize together in a given habitat so that no one individual stands out among the many. This chorus creates a protectively expansive audio performance inhibiting predators from locating any single place from which sound emanates. The synchronized frog voices originate from so many places at once that they appear to be coming from everywhere. However, when the coherent patterns are upset by the sound of a jet plane as it flies within range of the pond, the special frog biophony is broken. In an attempt to reestablish the unified rhythm and chorus, individual frogs momentarily stand out giving predators like coyotes or owls perfect opportunities to snag a meal"

"Because of the noise introduced into their environment by cruise boats traveling in Glacier Bay, humpback whales have been observed trying to swim away and hide from the noise, ducking behind spits of land or large blocks of ice that had broken off glaciers apparently in an effort to get into quieter "shadow" zones. Where once there were many, in recent years, fewer and fewer whales have been seen in the Bay. Along with other factors such as the special manner in which certain vessel noise may be amplified by the geological features of the Bay contour, it is believed by some biologists that human-induced noise is a major contributing ingredient to the falling numbers. "

"And very recently, Scott Creel, a biologist at Montana State Univ., along with a number of his colleagues, wrote a paper that tied (glucocorticoid) enzyme stress levels in elk and wolves to the proximity of snowmobiles and the noise they create in relation to the wild populations in Yellowstone and Voyageurs Parks. With wolves, over the period of time that snowmobile traffic increased 25%, stress enzyme levels increased by 28%. Conversely, within Voyageurs Park, a 37% decline in snow mobile traffic between 1998 and 2000 correlated to a an exact drop of the same percentage in stress enzyme levels over the same period. These figures are found to be comparable in elk. "

Appendix 4c

<http://www.naturesounds.org/conservENW.html>

Effects of Noise on Wildlife

As human beings continue their encroachment upon the last remaining vestiges of untouched wilderness, wildlife populations around the globe continue to diminish in size. The impacts of human encroachment and environmental pollution are evident wherever research biologists perform their studies: loss of habitat and territory; loss of food supply; behavioral changes in mating predation and migration; and changes in interspecies relationships, altered predator-prey balance, increased competition for food and shelter.

Human-induced noise pollution is one of many factors contributing to the depletion of wildlife populations. Laboratory studies and limited field research have uncovered four major ways in which animals are adversely affected by noise pollution:

- hearing loss, resulting from noise levels of 85 db or greater;
- masking, which is the inability to hear important environmental cues and animal signals;
- non-auditory physiological effects, such as increased heart rate and respiration and general stress reaction; and
- behavioral effects, which vary greatly between species and noise characteristics, resulting in, for example, abandonment of territory and lost reproduction.

Studies on Rhesus Monkeys in the lab have shown that a 30% increase in blood pressure following exposure to as an average 85 db (lower at night, higher during the day) for eight months resulted in a permanently higher blood pressure and heart rate even after one month of quiet time!

Appendix 4c – Con't.

Sound, stressed mice have been shown to be much more susceptible to disease, less able to learn mazes, and to experience 40-100% resorption of embryos and 66% reduction in fetal weight when exposed to 82-85 db (equivalent to a power lawn mower) for eight hours per day.

Exposure of Desert Kangaroo Rats to dune buggy sounds (95 db at 4 meters, on and off for 500 seconds) caused a major reduction on detection distance for its principal predator the Sidewinder (Rattlesnake). In fact, the distance for the normal sand kicking response to the snake's presence was reduced from 40 cm. to 2 cm., and it took three weeks for the rat to recover. Surely in the field, this nocturnal rodent could not have survive at such a disadvantage!

Plenty of evidence exists to indicate that serious damage is occurring to animals in the wild. Long-term effects from medium to low level noise intrusion need much more study, with emphasis on threatened and endangered species. The synergistic effects of noise with other stressors on animals also need investigation.

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