Fifteen Insights on the economic analytics of habitat exchange at Fort Hood, Texas.[1]

Notes by Frank Convery, David Wolfe and Jeremy Proville

1. **Without effective demand there is no business**

The demand came from the Department of Defense, driven by the fact that training needs (mainly for infantry) expanded, and this could only be met by expanding training into habitat of a rare and endangered bird species, the golden cheeked warbler on military owned land. Fort Hood wanted to actively thin out understory vegetation on 237 acres to facilitate troop movement and, in this case, the Fish and Wildlife Service requested that they offset this potential impact to the warbler by purchasing credits so as to secure protection of comparable habitat on private land. [The training needs have diminished; there is unlikely to be additional demand from Fort Hood for the foreseeable future].
Biological options in 1993 and 2000 restricted training on more than 66,000 acres of Fort Hood's training land; subsequent to 2000, training restrictions were eased somewhat, as the military had exceeded their goal for number of warblers on Fort Hood.

2. **The Value of Learning by Doing**.

A lot was learned about trust and what it takes to succeed, and an enthusiastic supply base was created. [This has been an essential experience base for the scaling up of ambition for the Lesser Prairie Chicken].. A good theory is great, but a working example is even better.

3. **The Importance of credible independent science**

The criteria that would need to be met for habitat were established in the first instance by David Wolfe (EDF) and a Science Committee. These then became the filter for identifying those lands that qualified on ecological grounds [including trees for nesting - Red Oak, Texas Ash - and for nesting material Cedar (Juniper) – the shredded bark of the latter is essential for nesting material) and minimum breeding area (250 contiguous acres)].

A total of 2201 acres of habitat were protected and managed on the 20 ranches. The minimum habitat acreage that could be enrolled was 50 acres, but it had to be part of a patch of at least 250 contiguous acres of habitat (not all of which had to be under the participant's ownership or control).[1]

4. **The Importance of Clarity in Quantifying the Units to be traded**

[1] The information derives from a visit by Frank Convery, David Wolfe and Jeremy Proville to Fort Hood, Texas, April 27 and 28, 2015, complemented with data (and associated page numbers) from an ex post study of performance, published by Robertson Consulting March 2010.

The units were initially denominated in area (acres) of habitat (20 acres = 1 unit). There were 2,201 total acres under active habitat management (and which were credited).[2] But subsequently the idea of adjusting for quality and specifying the units as 'adjusted acres' evolved, which were called 'credit units'. The number of credit units multiplied by the number of years for which the plan would last was called recovery credit years. For each ranch which was selected, a *Wildlife Management Plan* was prepared and implemented.

5. The Importance of Cost Effectiveness and integrity in the Bid Process

The costs of assessing the candidate habitat on a 1000 acre ranch were of the order of $1-2 per acre (1.5 days work)
Cost-effectiveness in terms of delivering habitat of the necessary quality was delivered by the bid process. Bids were invited from land owners whose properties met the ecological criteria. Bids were submitted which inter alia specified the minimum revenues that the bidder would need to receive in order to participate, the willingness to make a contribution (cost-sharing), and the length of the contract (10 years minimum, 25 year maximum) with more points assigned to longer commitments. This is called a 'reverse auction' because the winners in principle would be those who bid least, but other factors besides price were taken into account.

For the first auction, a (high) price was fixed, and bidders were invited to accept. For subsequent auctions, there was no fixed price. Bids were assessed initially according to the criteria by the *Texas Watershed Management Foundation* and Texas A&M
But there was input from other sources as well; the final decision was made by Fort Hood. Over a 3 year period, there were 8 auctions ('bid rounds') conducted, one every 3-4 months, and there were 21 successful bidders out of a total of 44.

The successful bids in the first auctions were high – up to $1,400 per recovery credit unit, then fell to around $500, before stabilizing around $600.

Because it was Federal money, the procedure had to be consistent with Office of Management and Budget Circular A1 33 (OMB)

There were no serious concerns with the process, but worth exploring ways to ensure independence of the administrator (so as to avoid conflicts of interest) and to maximize market integrity (i.e. avoid manipulating the market as much as possible, as was done initially by setting the price).

6. The value of Research and the publication of findings in peer reviewed journals

As well are providing new information, this independent work provided the intellectual important underpinning for the integrity of the process

7. The Importance of Understanding the Counter-Factual

[2] An additional 938 acres were identified as 'supporting acres'. These are acres did not qualify as warbler habitat and were not counted toward credit units, but were nonetheless identified as acreage that was important to warblers (for foraging, dispersal, potential future breeding habitat) and should be protected

If habitat exchange did not exist, what would the Army do? The options suggested were land or easement acquisition, regulation (either imposition to achieve conservation, or exemption of future regulation in exchange for conservation), or the purchase of conservation credits from Conservation Banks (private for profit) at an average cost of $3,000 per acre, but we need more evidence on this (the current market value of the Murph ranch visited was about $3,000 per acre)

However, it is very difficult to get cost information for other forms of mitigation as it is not typically publically available. Mitigation deals have too often been worked out behind closed doors on a case-by-case basis. To date, there has not really been a market for species credits at a scale that would truly bring into play significant market forces (Fort Hood was relatively small scale) to influence credit prices. The premise is that these markets will be cost efficient, but also that the value generated by habitat exchanges goes well beyond just cost efficiencies (e.g., streamlined participation for both buyers and sellers, quantification of outcomes, mechanisms to deal with climate change, etc.).

The costs per acre for Fort Hood can be summarized as follows:

Gross Cost ($)	**Area without supporting acres**	**Cost per Acre ($)**	**Area with supporting acres**	**Cost per Acre ($)**
3,442,074	2201	1564	3139	1097

With much bigger scale, and more scope, some of the costs are likely to fall, and achieving these reductions is important. Also, note the importance of the supporting acres in reducing the unit cost. Cost effectiveness is a key selling point for habitat exchange, so we need to know what would happen in its absence, in terms of delivering equivalent conservation outcomes.

We need to keep working at finding the counter factual costs.

8. The Importance of Institutional Arrangements and Credible Local Leadership

The *Texas Watershed Management Foundation* is the main vehicle for collective action on behalf of the ranchers, and it also played an important role in the implementation of the Fort Hood scheme (see 'Transaction Costs' below). Susan Combs, at the time Comptroller of Texas, was a key driver [her family have extensive land holdings and engagement with conservation]. An issue to be addressed for the future is to minimize concerns that if the Foundation develops interests and relationships with landowners, these will not pose substantive conflicts of interest for habitat exchange.

9. The Importance of Incentive Mapping and Alignment

The incentives for *land owners* were that they got income, investment in their land (fire breaks - gravel roads - and cross fencing) and training in fire management. The investment outlay was netted out from their payments (see 'transaction costs' below), and they did not have to pay Federal Taxes on this portion. We were told that the fencing improved productivity, by facilitating the movement of cattle around the ranch, so that the grazing could be optimized. Because the best grazing occurs on the more open, flatter land, and the best habitat for the golden cheeked plover is found in gullies and ravines where cattle grazing is difficult, there is little if any loss of farm output. However, there is a view that Juniper (called 'cedar' locally) 'drinks water' and the

conservation of this essential habitat is perceived as a potential source of productivity loss in dry years. For some ranchers, avoiding direct involvement with the Federal government, is an important consideration, and this mechanism delivers this. The incentives facing the *Army* (Fort Hood) were that this mechanism released for their use some of the habitat on their own land, at a very competitive cost, and provided conserved habitat they could point to if they were challenged by environmental interests in court or otherwise. It also engendered good will with their neighbors. The incentives facing the *US Fish and Wildlife Service* were that some of the habitat of a rare and endangered species was protected and enhanced. The incentive for *EDF* is proof of concept; it can be done, it is economically efficient and potentially scalable.

10. The importance of controlling transaction costs.

Because the habitat needs of each species are very particular, and each ranch is different, creating a market that is simple to understand but credible in terms of conservation is a challenge. The initial costs of assessment were low, but this may be difficult to sustain. The *Texas Watershed Management Foundation* played a key role in mobilizing land owners, and in finding contractors and getting the work done terms the on-ranch investments funded out of the habitat exchange payments. This was a big transaction cost saving for the ranchers. This approach resulted in economies of scale and consistency of high quality management.

11. The Importance of Establishing a Baseline

This was not done at Fort Hood, so we do not have a before and after story to tell. We know that the habitat conserved is in good shape, and that the warbler are doing well, but we don't know the difference between was and what is.

12. How Risk was handled

A Surplus of credits (10% reserve) was maintained, and debits were overestimated, so that the risk that the habitat used by the army would exceed that which was protected by the habitat exchange was very low.

The associated investment by ranchers in fire control (breaks) and training reduced the risk of destruction of habitat by fire. The financial risk to them was very low because payments were coming mainly from the Department of Defense

The risk to the Department of Defense of not delivering the habitat protection required was low because of the institutional arrangements and the commitment and expertise of the parties, and the alignment of incentives for all parties in a successful outcome

13. The Importance of Monitoring, Reporting and Verification (MRV)

Biological monitoring was conducted by Texas A&M during the three year pilot, but funds have not been available since that period to continue monitoring. It is possible that some population surveys have been conducted since 2009. Texas Watershed Management Foundation conducts yearly compliance monitoring on each site.

14. The issue of managing potential conflicts of interest

This does not appear to have been an issue in the Fort Hood case – the incentives were aligned in achieving a successful outcome.

In the case of future habitat exchanges, it will need to be addressed and managed. There is now a commercial consulting company – Natural Resources Solutions (http://www.naturalresourcessolutions.com/about/) of which Steve Manning is the Principal. He was a founder member of the Texas Watershed Management Foundation, and a key leader in the development and implementation of the Fort Hood habitat exchange. His company represents the oil and gas interests in the negotiation and development of the Lesser Prairie Chicken exchange. As such, his business interests continue to be aligned with success. If this works and is rolled out elsewhere in the country, he will have a growing market for his services. However, he also has an interest in minimizing the costs for his corporate clients, and there is likely to be a tradeoff as regards the costs and quality of the habitat conserved. This is eminently manageable, in the sense the imprimatur of EDF is fundamental to securing the integrity of the process and this in turn is fundamental to securing both the agreement by key interests, and to the prospects of the program in meeting legal challenge successfully.

15. The Challenge of Securing buy-in by State Fish and Wildlife Agencies

A common practice in achieving habitat offsets is for the developer to pay money to the relevant state agencies, which in principle use this money to secure the equivalent habitat elsewhere. In practice, there is a lack of transparency in this process; in many cases, it is difficult to impossible to identify the habitat so conserved. Many state agencies are suffering from budget cuts, and this revenue can be an important source of support for basic services. The companies are not happy with the lack of transparency for two reasons: for public relations, it is good to be able to point to habitats in which their money has been invested; if there is legal challenge, the inability to identify habitat conserved of equivalent quality could undermine the program and interrupt and delay their developments.

Costs over 3 Years (p. 5)

Activity	Amount	% of Total
Admin Costs	87,294	2.6
Research and Monitoring	975,000	28.3
Program Costs (habitat assessment, management plan, staff (Texas Wildlife Management Foundation etc.)	425,114	12.4
Landowner revenue	1,954,666	56.8
Total	3,442,074	100

Reference

Robertson Consulting Group, Inc. 2010. *Third Party Evaluation of the Recovery Credit System Proof of Concept* March