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Report on the Use of Aerial Photographs for Identifying Wetland Permit Violations

Prepared by the

Northern Virginia Planning District Commission

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U.S. DEPARTMENT OF COMMERCE NOAA
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REPORT ON THE USE OF AERIAL PHOTOGRAPHS FOR IDENTIFYING WETLAND PERMIT VIOLATIONS.

INTRODUCTION

As long as individuals chose to live along the shores, development activities within this coastal fringe will continue to exert tremendous pressure on Virginia's tidal wetlands. Tidal wetlands have been protected in Virginia since the passage of the Wetlands Act in 1972 which requires a permit for the use or development of tidal wetlands. These were defined as that land contiguous to mean low water extending up to an elevation of one and one-half times the local mean tide range, and upon which is growing any of a number of wetland plant species listed in the Act. The Wetlands Act was amended in 1982 to include all non-vegetated areas between mean low water and mean high water.

Once permits are granted, there is no requirement or suggestion in the Wetlands Act or in the guidelines promulgated by the Virginia Marine Resources Commission (VMRC) that the permits be monitored for compliance. In many cases, noncompliance involves construction of bulkeads or riprap revetment at alignments up to several feet channelward of the permitted alignments. In other cases, permittees do not dispose of dredge material in the permitted locations or manner, or construct boat ramps in locations other than those permitted.

Both individually and cumulatively, wetland losses due to permit noncompliance are potentially significant. Because of their great and unique values as an ecological component of the marine environment and as a physical buffer for erosion, flooding and water quality control, continuing unecessary losses of wetland resources should be avoided.

A prudent wetland management program should therefore include some method of determining compliance with permits granted. A program which grants permits without monitoring them for compliance has the potential to undermine the regulatory process by allowing unecessary wetland losses.

Fairfax and Prince William counties have wetlands boards which review and permit construction activities that potentially impact tidal wetlands. Granted permits often contain special conditions to minimize wetlands impacts or to protect wetlands adjacent to permitted construction activities. The boards are authorized to enforce both their permitting conditions and any violations of tidal wetlands without a permit. Enforcement is performed through construction site inspections, stop work orders, through "after the fact" review of wetlands construction activities, and through legal means.

The Fairfax County Wetlands Board uses two (2) staff persons from the Fairfax County Office of Comprehensive Planning as their primary enforcement arm. Prince William County wetlands board uses one (1) person from the Watershed Management Division of the Public Works Department as its enforcement staff. Neither of these enforcement staffs of the wetlands boards are the primary code or permit enforcement arms for construction projects in their respective counties.

Neither Arlington County nor the City of Alexandria have wetlands boards. The amounts of tidal wetlands in these localities, especially wetlands on privately owned properties, is far smaller than in either Fairfax County or Prince William County. Arlington County and Alexandria permit wetlands associated activities through their normal site plan approval and construction permitting processes. Permit enforcement of wetlands protection conditions are performed by their construction permit enforcement departments. These full-time construction inspection departments tend to be better experienced in detecting construction permit violations than do the wetlands boards' support staff who perform these functions as secondary duties.

Two other agencies, the Northern Virginia regional office of the U.S Army Corps of Engineers and VMRC, also face similar problems with permit enforcement and with unpermitted violations of wetlands related construction permiting requirements. The Corps has primary Section 404 responsibility for approval of activities affecting tidal waters and/or associated tidal wetlands. The Corps has a qualified inspector to check on violations of permit conditions; however, they only have one (1) person performing this task for the entire Northern Virginia

region. VMRC performs wetland permitting and inspection functions where wetlands boards do not function. VMRC also has one (1) person primarily responsible for agency functions in the Northern Virginia region. This person is located in Newport News, however, and is not readily available to detect violations.

Violations of tidal wetlands construction permits are difficult to police. Often there are very close tolerances in permitted distance between construction activities and protected wetlands. It is difficult to install and maintain tidal wetlands survey points on a construction site for permit inspectors to insure that construction does not encroach on protected welands.

However, the most difficult policing occurs when tidal watlands permits are not obtained at all, and construction activities take place surreptitiously in wetlands. Policing then occurs only if some interested party notices the activity and reports it. Such notice usually occurs when sediment or other construction related by-products are noticed in nearby waters, from the air, or by passers-by to the site. These are the most difficult violations for local wetlands boards' staffs, for the Corps of Engineers, and for construction inspection departments to detect.

Fairfax County, Prince William County, and the Corps of Engineers have had tidal wetlands violations occur that were not permitted, and which were later detected and reported after tidal wetlands destruction had occurred. If these violations had not been reported by observers, they would never have been known to have occurred. The Corps of Engineers and county wetlands boards can require restoration of damaged or destroyed tidal wetlands when such unpermitted activities are called to their attention, or mitigation can be required to minimize the damage that has already been done, or other legal penalties can also be pursued.

While actions are being taken by the counties that will make it harder to impact tidal wetlands without a permit from a wetlands board, it will still be difficult for wetlands boards to insure that no tidal wetlands destuction occurs without a better method of policing for violations. The use of aerial photography and aerial

survellience are excellent methods for identification of unpermitted wetlands activities. However, the budgets allocated to the county wetlands boards, VMRC, and the Corps of Enginees' regional office for enforcement activities limit their access to these detection methods. NVPDC's proposed program (described below) was to obtain and distribute enlarged shoreline aerial photographs twice during this grant period to wetlands boards, permit enforcement staffs, VMRC and the Corps of Engineers. Originally, NVPDC intended to take photographs at the beginning and then at the end of the grant period to compare and attempt to identify activities in wetlands areas that may not have been permitted. After reviewing the options, however, it became apparent that there were two separate approaches to identify nonpermited wetland violations: the first was a set of high altitude aerial photographs, enlarged to a scale of 1"= 600' from the Fall Line, near Georgetown, south to the Prince William County line; the second approach was to take a collection of low altitude aerial photographs, flown 500 feet above the water along the Potomac River shoreline, and up into each of the embayments. The photographs were used to identify and inspect apparent wetland violations and the two approaches compared to evaluate cost effectiveness, utility and replicability for use in other jurisdictions. Overall, the aerial photographs have promised to be a valuable tool for identifying wetland and possibly other violations, that typically otherwise go unnoticed.

METHODS

NVPDC purchased seven 52"X52" black and white photo enlargements covering the shorelines of the City of Alexandria, and Fairfax and portions of Arlington counties. The photographs were taken in October, 1991 and enlarged to a scale of approximately 1"= 600.' Three additional color photo enlargments of Prince William County's shoreline, taken June 17, 1991 were purchased separately to complete the set. Copies of the enlargments were given to each locality, the Corps of Engineers and NVPDC. Total cost for the set of photographs and copies came to approximately $4,500.

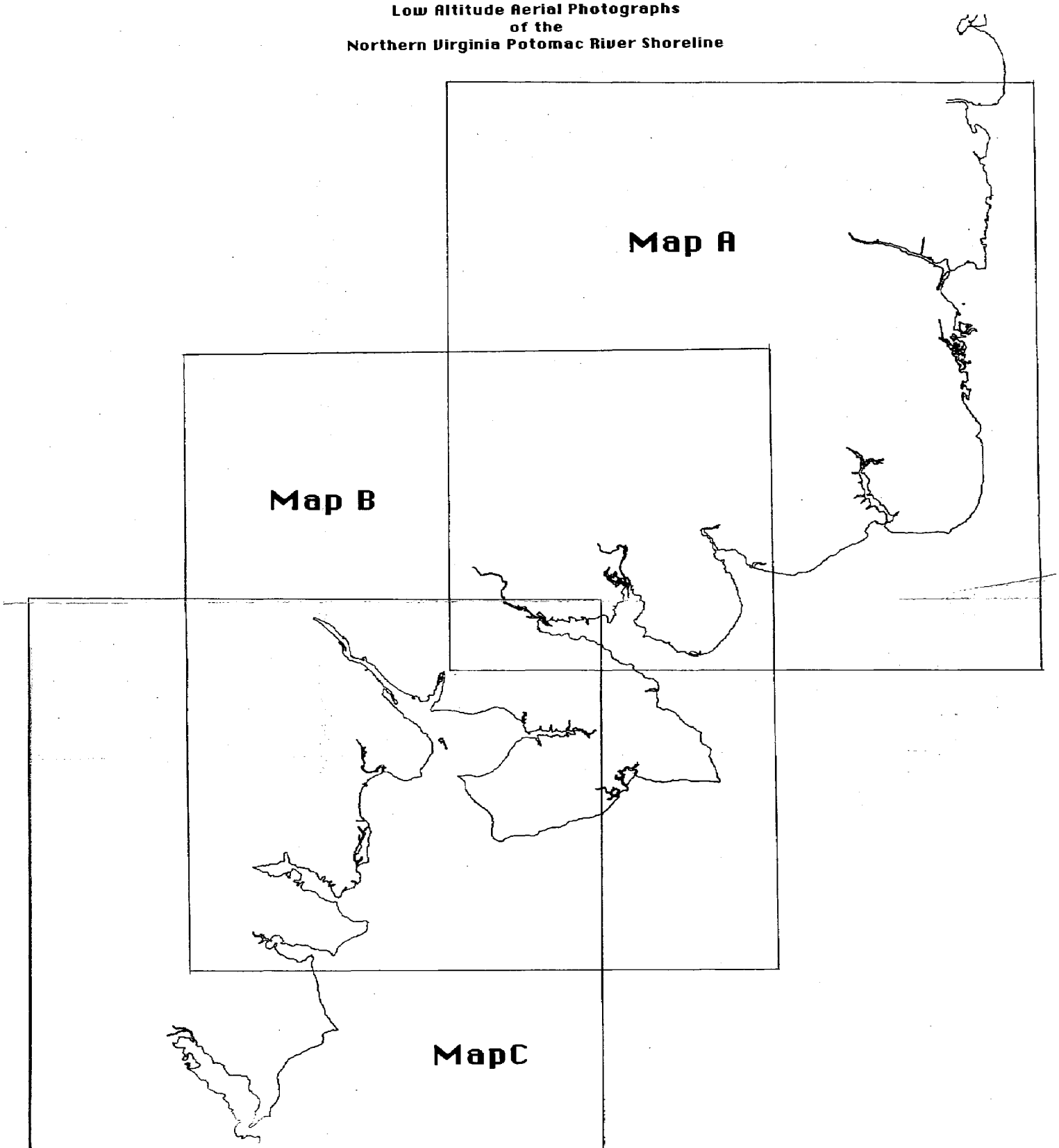
There was difficulty, however, arranging another complete flight coverage of the Potomac River shoreline. Because of financial limitations, we were previously

forced to accept earlier flown aerials, at the contractor's convenience and in connection with other business. To have the aerials flown specifically for ourelves would have been prohibitively expensive. They said they would fly our section of the Potomac River again early summer. We inquired if it was possible to fly them during the spring, before leaves appeared on the trees to reduce obscuration. Unfortunately, this was not possible. In fact, half-way into the summer season, we had still not heard from them. We inquired, but due to slow business, they did not have negatives available for us to have enlarged. They suggested we call back late summer.

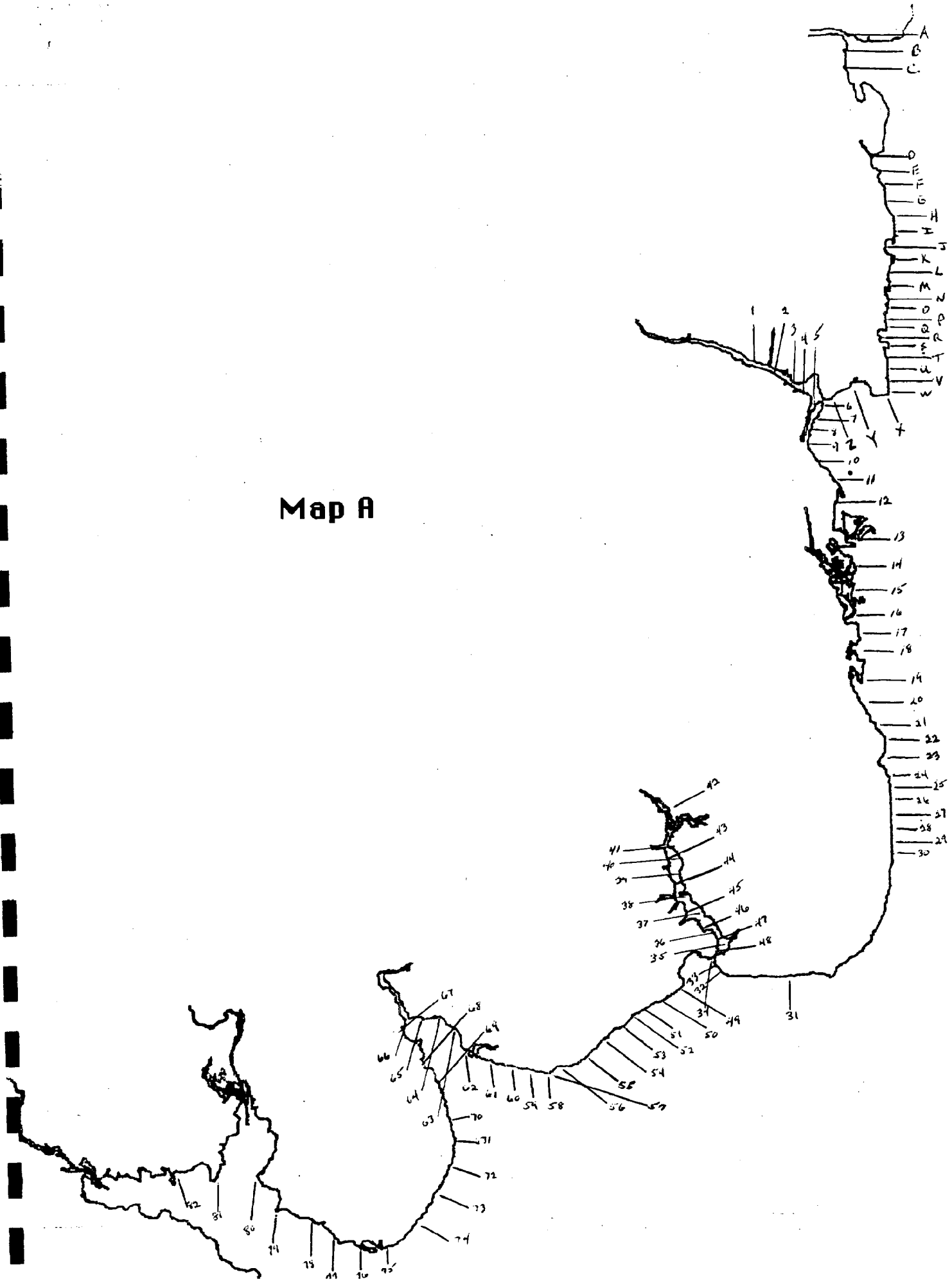
What initially seemed to be a great disappointment, soon proved to be an excellent opportunity. Arangements were made with NVPDC's project manager, who also happens to be a recreational pilot, to fly the Potomac River from National Airport south to the Prince William County line, and then up into each of the embayments. Slide photographs and video tape of the project area were taken 500 feet above the waterline. Clearance was subsequently requested and received to fly those portions of the Potomac River shoreline lying within controlled airspace: Davison Airfield at Fort Belvoir, Quantico Naval Air Station and National Airport, to complete NVPDC's aerial coverage of privately held tidal shoreline property along the Potomac River. Upon consideration, we elected not to fly the small section of shoreline north of National because: 1) it is entirely federally-owned property, 2) it is almost completely hardened with stone riprap, and 3) the area lies within the confluence of airspace near the Pentagon, prohibited areas near the Mall and also the final approach course into National Airport -- one of the busiest in the nation. Other than that, air traffic controllers were suprisingly very accommodating. Maps A, B and C show the study area and approximate locations fof each of the individual low altitude photographs.

The slides came out exceptional. They were very clear, and afforded much detail, especially when focused on a large screen. Underwater structures, sediment plumes and even individual trees and an occasional waterfowl were clearly visible. We made sure to include some overlap between photographs in order

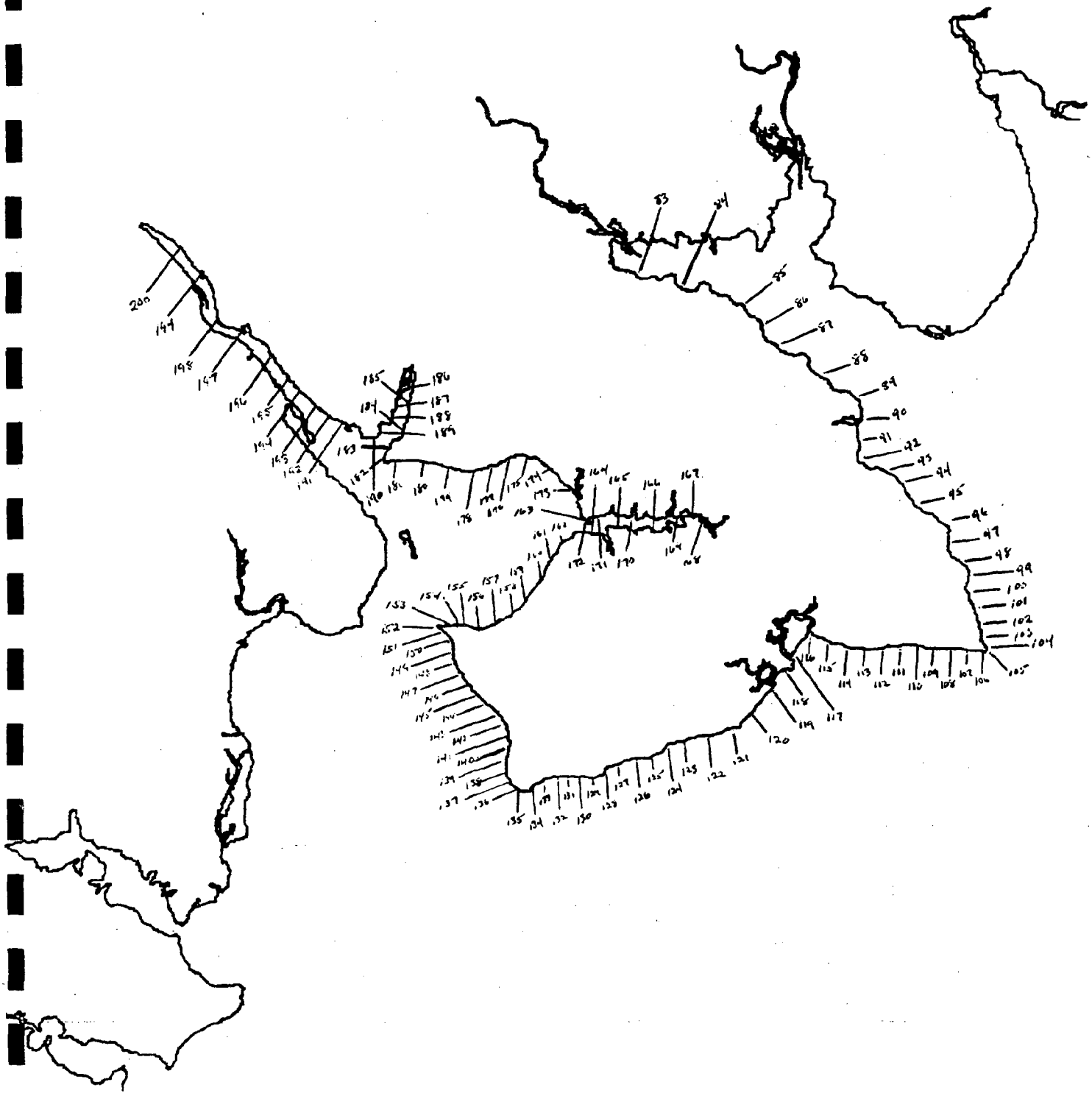
1992
Low Altitude Aerial Photographs
of the
Northern Virginia Potomac River Shoreline

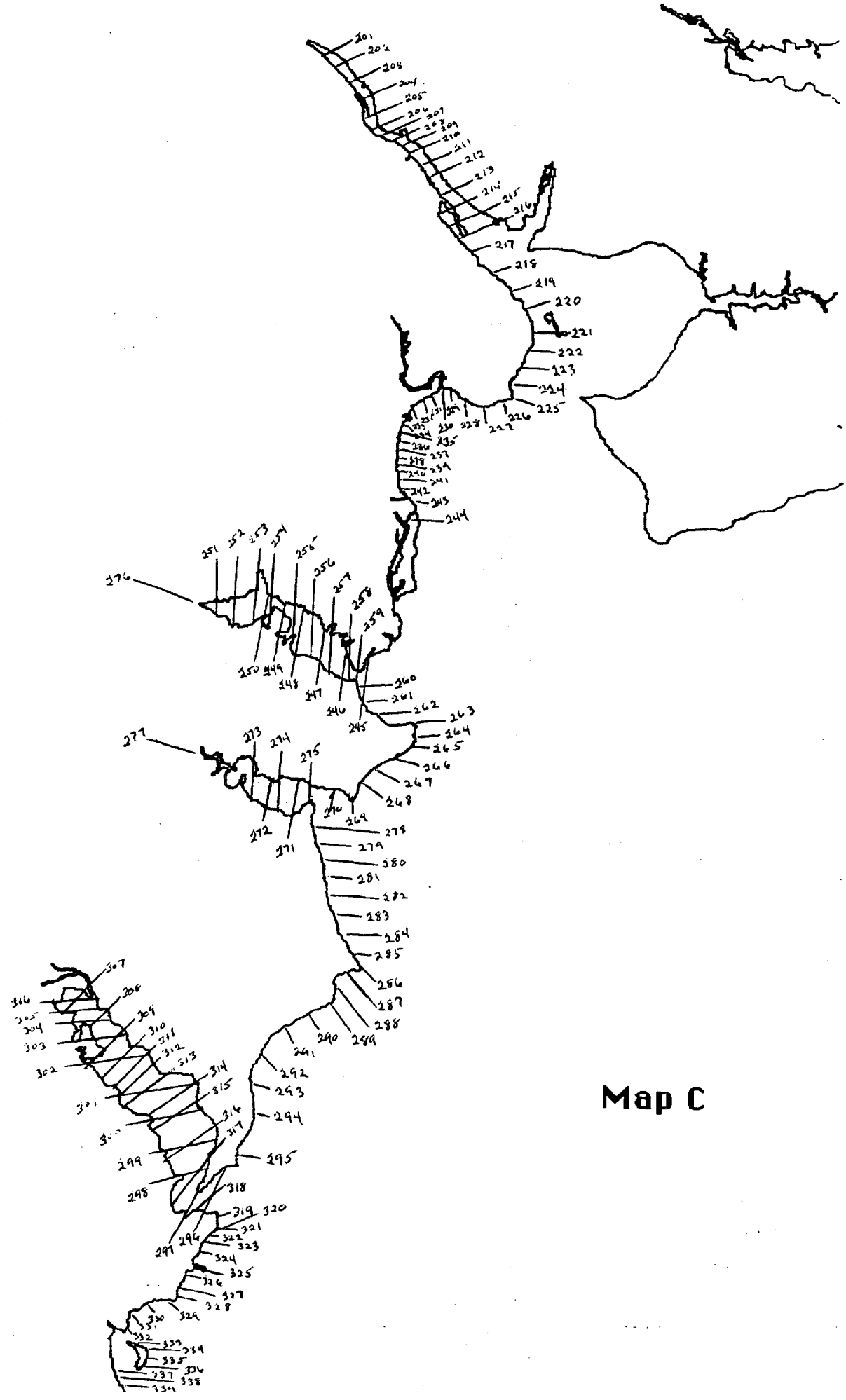


Preparation of these photographs was funded by the Virginia Council on the Environment, through a grant provided by the Coastal Zone Management Act of 1972, as amended and administered by the National Oceanic and Atmospheric Administration. CRMP Grant #NA170Z0359-01.


Map A

Map B





Map C

that the viewers could maintain their orientation. The videotape, on the other hand, turned out only fair, and not nearly as useful for quickly finding specific site locations, or stopping frame to examine them closely.

The slides were collected, copied and distributed to U.S. Army Corps, Virginia Marine Resources Commission, Shoreline Erosion Advisory Service (SEAS), Fairfax and Prince William wetlands boards, the City of Alexandria; and the Prince William Park Authority ordered a set for themselves, having reviewed the originals. A single set of the 360 photographs came to less than $150 (when ordered in quantities of more than 500). More significantly, we were able to fly 144 miles of shoreline in approximately 6 hours and at a total cost of $400. Keep in mind, this included time circling to be allowed clearance into controlled airspace, overlapping flights to fill gaps in coverage, and time to get equipment set up, coordinate personnel and get acclimated to flight conditions. Time and efficiency could easly be improved upon, given a more experienced crew and previously developed routine -- resulting in additional savings.

Overall costs for the flight time and photograph copies distributed to the U.S. Army Corps of Engineers, VMRC, Fairfax and Prince William wetlands boards and the City of Alexandria, came to less than $1,000. Compared to the approximately $4,000 to conduct the high altitude aerial surveys , the savings became immediately apparent. Also, much headway was gained and lessons learned with this project prototype, towards future continuation of this approach. We are truly optimistic this technique will prove extremely valuable for identifying wetlands violations, as well as other environmental impacts, that typically otherwise go unnoticed.

In the past, violations usually resulted in either voluntary restoration or more frequently, submittal of an after-the-fact application for a permit. Violators were usually asked to appear before the Commission or wetlands board and reprimanded for their action, with the intent of producing a lasting impression through public admonishment. The prospect of prosecution within the judicial system was previously and remains a viable opton. Unfortunately, the inherent

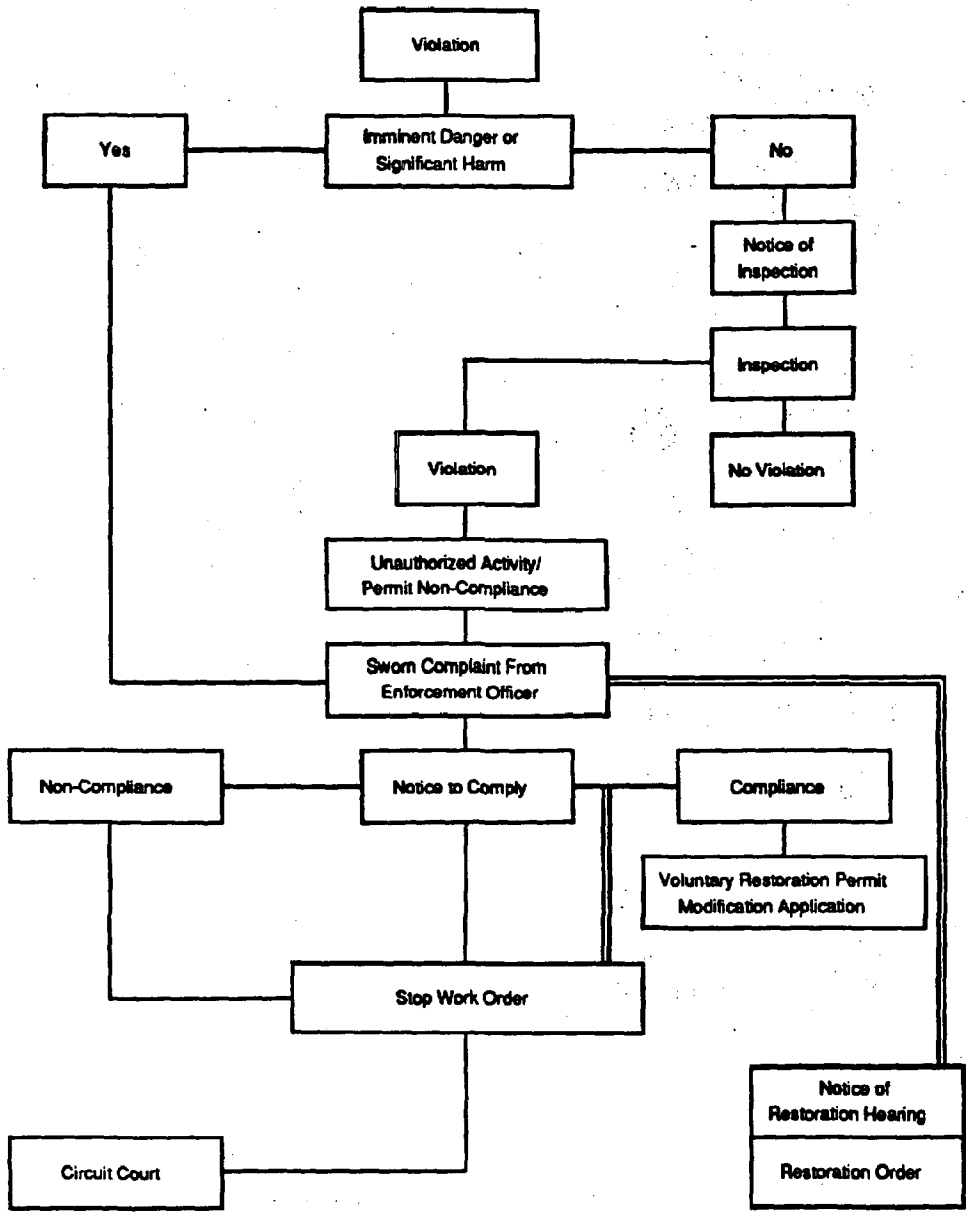
problems associated with preparing a case to go to Circuit Court remains unchanged.

Enforcement procedures within Virginia's 32 wetland boards has in the past reflected the varying degrees of complexity found in each local government. Figure 1 represents a generalized flowchart, by the Virginia Marine Resources Commission, outlining the enforcement component incorporated into the Code of Virginia regulations for subaqueous lands, tidal wetlands and sand sunes. The components provide a basis from which localities can refine an enforcement mechanism, which is legally complete and reflects the unique character of each locality. The enforcement flowchart identifies two available paths for invoking civil penalties or charges. Both paths involve identifying the presence of a violation. Once a violation has been determined and documented sufficiently, a Sworm Complaint is issued, followed by a Notice to Comply. In cases where restoraton is a desireable conclusion, the individual has the option of restoring an area to pre-existing conditions. Otherwise, applicaton for a permit modification of after-the-fact approval is necessary.

In the absence of complete and satisfactory restoration, anyone found in violation of these Code sections is subject to either a civil penalty (Circuit Court) or to a Civil Charge (local wetlands board). In Circuit Court, a judge can levy a civil penalty up to $25,000 for each day of violation. The Commission and wetlands boards may assess civil charges of up to $10,000 per violation, which are to be paid in lieu of any appropriate civil penalty and can be assessed only with the consent of the person in violation. The obvious intent of both civil penalties and charges is to provide financial disincentives against violating the law, while at the same time providing the impetus to resolve these issues at an administrative level.

The adoption of financial disincentives places a burden not only on developers, but also on individual wetlands boards. As briefly touched on earlier, many of the problems previously associated with enforcement efforts remain today. While it may prove relatively easy to determine that a bulkhead was constructed without authorization, it is somewhat harder to detemine the extent of

Figure 1 - Enforcement Procedures



Source: VMRC, 1991

encroachment beyond that which was authorized by a particular permit. The aerial photographs, and particularly, the low altitude slides are useful for monitoring compliance: first of all, identifying the violation; secondly, degree of non-compliance or extent of a violation; and most importantly, degree of environmental impact.

For example, two stands of vegetated wetlands may be viewed differently depending on the dominant plant species. A "group one" wetland supposedly ranks higher in value than a "group five" wetland and therefore, would tend to be a more significant loss even though on an areal basis, the impact might at first appear relatively equal.

Table 1, Civil Charge Determination, has been developed to ensure continuity between all the wetland boards as they arrive at an actual dollar amount representation of the violation in question. This assessment is designed to contain the flexibility necessary for each individual board to arrive at a conclusion based on the specific terms of each individual violation. These amounts are by no means absolute and are intended to be used as a guide rather than a template. Hopefully, an existing record of the shoreline previous to the violation will allow the impact to be better determined in the context of the surrounding environment. Also, over time, a record of cummulative impacts may be determined for future consideration.

Table 1 - Civil Charge Determination

	Significant	$5,000	$7,500	$10,000
Environmental Impact	Moderate	$1,500	$3,000	$4,500
	Minimal	$500	$1,000	$1,500
		Minor	Moderate	Major

Relative Degree of Deviation or Non-compliance

Source: VMRC, 1991

RESULTS

According to correspondence and conversations with the U.S. Army Corps, VMRC, Prince William and Fairfax wetland boards, they have all been very pleased to have received both the high and low altitude aerial photographs. According to the U.S. Army Corps, they are "amazed at their clarity and utility." They have identified three areas of concern already, but since these cases may be the subject of judicial review, they are not at liberty to discuss details at this time. They will be checking these areas in the near future to determine the extent of any violations. There are two other existing violations that show up in the photos, and also must remain confidential. For one of the violations they did not have an "after" photo, so these pictures may be used in court to dramatically show the extent of the violation. They have also received a complaint near National Airport and staff is reviewing the photos to see if there is a legitimate problem.

According to the counties, Prince William County did not have very many permitted activities last year, probably due to the recession. Also most violations are observed by board members, most of whom live along the water. The chairman said the photographs were very useful and that they would be presented to the board. The Prince William County wetlands board has long desired better aerial photos, but has not had funds for their aquisition. The photos that are available to the board through county agencies have limitations. These relatively smaller-scale photographs are only taken in the winter, and not every year. Low altitude photographs, on the otherhand, 500 feet above the water, taken after and during the growing season would be most helpful in finding and proving wetland violations.

Although the primary intent of this investigation was to aid federal, state and local governments in detecting violations, there appears through conversation to be many other beneficial uses for the photographs. According to the U.S. Army Corps, their usefulness for overall project review has become clearly evident. The new marina at Leesylvania State park is a good example of compliance monitoring that can be done from the photographs. It has been a simple task for

them to compare the work that has been completed with the work that was authorized under their permit, thus saving them considerable effort for their manditory permit review and compliance inspections throughout these counties.

Another example of the usefulness of the photos is in the project review of Prince William County's proposal to construct four stormwater management ponds in Powell's Creek. One of the photos was put on display at a recent seminar to discuss the issues surrounding their project. They said it was extremely helpful to be able to show people from all over the state what the area looks like, without having to arrange a field visit. The high altitude photographs provide a birds-eye-view of the whole valley, which is crucial to understanding the land use and positioning concerns during site evaluation.

They said they would also be working with the Topographic Engineering Center (TEC), at Fort Belvoir, to develop additional methods of photo-interpretation. They have the ability to digitize images, compare images from, different years and show the changes that occur over time.

Overall, the potential benefits for these photos include: better coverage and surveillance of Norhtern Virginia, verification of authorized and unauthorized activities, legal documentation of violations, better overall perspective of the areas under permit review, and reduced field time.

There also appears to be important applications beyond tidal boundaries. Aerial photographs have great utility for reviewing activities in both nontidal as well as tidal wetlands. Although the regulations affecting those nontidal resources are different than the tidal wetland regulations, the responsibility is shared by the U.S. Army Corps, Virginia State Water Control Board and the localities involved with the Chesapeake Bay regulations.

Other sections of these county governments might also be interested in compliance with soil and erosion conditions. Since the problems that affect the Chesapeake Bay begin in the headwaters of the tributaries that flow into the Bay, it would be extremely useful to be able to detect disturbances on a larger

watershed basis, that is only possible with an expanded view of the terrain offerred by aerial photographs.

RECOMMENDATIONS

Aerial photographs are clearly proven to be a useful technique for identifying wetland permit violations, as well as a whole host of potentially other environmental monitoring and research applications. Yet, which technique is best: the high or low altitude photographs? Although both are useful under different circumstances, some important insights have been drawn below, that best suits the unique damands of local governments.

First of all, we considered cost. From our experiencess, low altitude photographs cost considerably less: approximately 150 miles of Potomac River shoreline and embayments were flown in six and one-half hours, and cost less than $500. This was a first-trial event, an experienced crew with a pre-established routine could accomplish the task in possibly half the time. We were also faced with airspace restrictions around Davision Airfield at Fort Belvoir, Quantico Marine Base and National Airport, which required clearance to enter. Although air traffic controllers were very accommodating, we were often required to circle as they worked us into the traffic pattern for that day. The total cost, including one set of original photographs and three sets of 360 developed photographic slides, came to less than $1,000.

Total cost for the high altitude photographs, on the other hand, came close to $4,500. This included ten original 52"X52" photo-enlargements of the Potomac River shoreline, at a scale 1"= 600,' and only two sets of copies.

Second, we considered the detail between the high altitude photo-enlargments and the low altitude slides. According to representatives of the various permitting agencies, the scale for the high altitude photo-enlargements was still not large enough to clearly destinguish single lot violations, unless they were significant. Permit violations, often measured in single feet, cannot always easily be distinguished at 1"= 600' scale. Also, we often found shorelines obscurred by

tree cover in the sumer, shadows and SAV (which is dark), making the shoreline harder to identify, and common on the high altitude aerial photo-enlargements. In addition, the high altitude photographs became blurred as the scale is enlarged, and their large size made them physically inconvenient to manipulate and store.

The low altitude slides, on the other hand, taken 500 feet above the water, came out exceptionally clear. Also, the photographs were taken at an angle oblique to the shoreline, thereby eliminating the problems associated with tree cover. Although scale varied depending on the angle and altitude of the photographs, we found that the photographs could be greatly enlarged simply by focusing them on a large projection screen. We were easily able to identify individual trees and even an occasional waterfowl. Even though the shots were oblique, distances could still be established by comparing them to fixed reference points, like buildings and similar structures. We found that construction sites, disturbed soils and even sediment plumes in the water were easily identified.

More important, we found the low altitude aerial photographs could be taken anywhere and at anytime; unlike the high altitude photo-enlargements which must be reproduced from existing negatives from someone else's previously contracted flight. In this respect, the low altitude photographs offered far greater flexibility. In fact, we waited until late summer for a flight they expected to conduct early spring -- which even then never occurred. Low altitude flights were only constrained by weather, and we found that our response time for fair weather and getting into the air was within hours. Also, considering we asked the high altitude aerial contractor if we could receive photographs with the leaves off sometime early spring (and were denied), the increased flexibility exhibited for low altitude photographic missions shows much greater promise. This also does not preclude the fact that we could have just as easily conducted the flight from 10,000 feet, but chose to remain low for better detail. Other investigations may require a larger watershed view, which could easily be accommodated and at less cost.

Finally, we considered how easily the approaches could be repeated for other jurisdictions. Ignore for the moment that the high altitude photo-enlargements

suffer greatly in terms of cost, flexibility and detail; low altitude photographic missions can easily be conducted by other jurisdictions at minimal effort. There are also economies of scale if one jurisdiction chooses to share its products with other localities. For instance, one flight can generate many copies of photographs for use by the various permitting authorities. Also, two different projects could be accomplished in tandem, thus saving the often substantial and largely unproductive costs of simply flying to and from the airport. We found that the field based operator (FBO) at any airport will gladly provide a 4-seat airplane and instruction-certified pilot for an average $75/hour. If one were to ask around, there are also many recreational pilots who will fly for less -- simply to build airtime. The typical 4-seat aircraft will easily accommodate 3 photographers. A 2-seat aircraft is slighlty less expensive, but will accommodate only a single photographer and some persons may feel somewhat claustrophobic. We inquired into using a helicopter, but this was prohibitively expensive, and really nothing gained that cannot also be accomplished by a fixed-wing aircraft.

This approach can easily be replicated by other jurisdictions. The only inconvenience was probably obtaining clearance through controlled airspace. National Airport is one of a handful of Terminal Controlled Areas (TCAs) established at the busiest airports throughout the United States. Restrictions to flight through these areas are established to separate high densities of aircraft, and traffic control is basically left to the descretion of the air traffic controller. We called them ahead of time and described our intentions, and actually found them to be tremendously helpful upon initial contact, once we were in the air. After being cleared into the traffic pattern, we were easily able to accomplish our objectives.

Certain military areas, on the other hand, may not be as accommodating. Restricted areas over sections of the Potomac River near Dalhgren, Virginia and airspace restrictions extending into the Northern Neck, from Patuxent Naval Air Station in Maryland, contain hazardous military activity. Controlled areas surrounding the cities of Richmond and Norfolk, Virginia are far less hazardous. Clearance can usually easily be obtained by contacting the appropriate air traffic controller with a request. All pilots know where these areas exist, the extent of

limitations to flight, and who to contact. Every other section of the state may be flown relatively freely. Pilots will gladly describe which activities are permitted where.

One other important note, we found that the photographer would often become queasy after extended periods of time looking through the camera. This is the result of vertigo accompanying loss of visual reference with the horizon and the movement of the aircraft through all three axes of motion. Different people are affected differently. One remedy is to focus on a fixed object outside the aircraft, like the horizon, and everything should begin to settle down. This should be conducted periodically throughout the flight, as needed, to keep the photographer from feeling ill.

CONCLUSION

Even though the stage has been set, it is still much too soon to gauge the future success this approach will have for identifying and prosecuting wetland permit violations. Nonetheless, initial results have come back tremendously positive. Already there have been sites identified that are now facing legal action. However, it will take time for this technique to become accepted and proven above other methods. As more sites are identified and action taken, word will get out and people may be less likely to run the risk of being caught violating state and federal wetland laws. People have to become accustomed to using this approach and to explore what appears to be many other added useful benefits.

Typically, the low altitude aerial photographic slides have proven themselves much more beneficial than the high altitude photo-enlargements in terms of detail, flexibility for use and especially cost. The low altitude photographs save much field time for agencies like the U.S. Army Corps, VRMC, SEAS and local wetland boards and planning departments, who have limited staff and often headquartered many miles distant. For example, in Prince William County, we were able to scan the entire shoreline in as little as fifteen minutes, stopping occasionally to investigate sites seeming suspect.

We found that 155 miles of shoreline can be flown (Prince William, and Fairfax counties and the City of Alexandria) and a single set of original photographs developed for about $500. This small additional cost could easily be incorporated into existing fees presently charged for issuing permits, and used for monitoring compliance. The cost savings in personnel field time alone justifies the expense. In terms of seasonal availability, low altitude aerial photos are available year-round, given favorable weather conditions. There was mixed feling between the respondents whether summer photos were better than early spring. The answer hinges on ones objectives: sumer photos are excellent for highlighting vegetation types, useful for delineating wetlands, and distribution of submerged aquatic vegetation (SAV). However, tree vegetation can hide construction activity and impacts along the shoreline; therefore, investigations along these lines are best carried out before leaf-out.

Finally, low altitude aerial photographs exhibit a wide range of other uses easily available to local jurisdictions: they may be used to document and monitor compliance with the Chesapeake Bay Preservation Act along designated resource protection ares (RPAs); they are useful for identifying wetland boundaries by changes in vegetation types, and they are useful for researching shore erosion and distribution of SAV. We were able to distinguish individual trees, submerged structures, and sediment plumes from construction activities became clearly evident. The slides serve a very useful historical record of existing conditions and can be used possibly for determining future cummulative impacts. They are also easy to store. We hope to determine GIS application for photographs taken at higher altitudes that are planimetric with the earth's surface. Finally, they serve as an exceptional legal tool for establishing the impacts of permit violations on the surounding natural environment.

It is really too soon to estimate the success of this program until it has been given a chance for people to grow accustomed to using the approach, and explore the many associated and added benefits. Nonetheless, such excellent coverage, at such a reasonable cost opens up a whole range of opportunities to satisfy the special needs of local governments in protecting these valuable areas. NVPDC

will continue to assist its local jurisdictions in examining these new and exciting opportunities.

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RESOURCE PROTECTION AREA
AUTHORIZED DEVELOPMENT SITE
PLEASE CALL RIVER COUNTY AT 296-6600
WITH QUESTIONS OR CONCERNS

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WETLAND

SENSITIVE AREA BOUNDARY

HELP PROTECT AND CARE FOR THIS AREA

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WETLAND

SENSITIVE AREA BOUNDARY

PLEASE CALL RIVER COUNTY AT 296-6600 WITH QUESTIONS OR CONCERNS

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WETLAND
DEVELOPMENT SITE
HELP PROTECT & CARE FOR THIS AREA

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September 8, 1992

Mr. Michael Kakuska
Coastal Resources Manager
Northern Virginia Planning
District Commission
7535 Little River Turnpike
Suite 100
Annandale, VA 22003

Dear Mike:

Thanks for the slides! A few of us sat in on the "tour of the Potomac River" and were impressed by the amount of coverage and detail they provided. It was also interesting for some of our other engineers who used to work the Northern Virginia area to see the change in the shoreline and the outcome of previously permitted projects. You must have had calm, clear weather to get such good shots.

As far as using the slides for identifying possible violations, about the only suggestion I would have is to make available the date, time and tidal stage that a particular set of photos were taken in order to give a better idea of jurisdictional areas. If you fly this again, a date-back gadget for the camera may be a worthwhile investment.

Thanks again and let us know if we can be of service in the future.

Sincerely,

Jay M. Woodward
Environmental Engineer

JMW/kmh

DATE DUE

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